The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXI. No. 532 SEPTEMBER 7, 1929 Prepaid Annual Subscription United Kingdom, £1.1.0; Abroad, £1.6.0

Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street, London, E.C.4), are closed on Saturdays.*

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

Marketing American Chemicals

FOLLOWING the recent conference in Paris of United States trade commissioners, Mr. Concannon, who organised the conference, has been speaking at the Berlin Advertising Convention on the marketing, not only at home but abroad, of American chemical products. The attention that the United States is giving to the development of export trade is part of a movement that has been going on for some time. We remember some six or seven years ago listening to Mr. Julius Klein, who was present at a New York banquet to a British Trade Press delegation in the place of Mr. Hoover, his chief at that time at the Department of Commerce, developing the case for looking more and more to outside markets as the domestic capacity to absorb the domestic output gradually diminished, as he prophecied would be the case. Since then the sense of the need of cultivating foreign trade has strengthened, and the visit to Europe is evidence that America is not wholly indifferent to the markets of the old world. It is all based on Hoover's dictum—"To create a sense of need abroad for our particular goods—to induce the purchase of them—is a science in itself."

Mr. Concannon's address, the substance of which is reproduced in this issue, is an admirable description of the methods adopted for this new science—"merchandising methods," as he describes them, "that have advanced a relatively new industry to a dominant position in domestic and world markets." Though the conditions in the old and new worlds may differ widely, the organisation described for exploring markets and securing new business is worth the attention of all interested in export trade. It shows how highly the art of salesmanship has been developed in the United States, and the thoroughness with which the sales campaign is planned and carried out. One fundamental point is that the sales appeal must "tie the product to the self-interest of the buyer." Finally, Mr. Concannon refers to the value of trade journal advertising, "which has a great influence on the marketing of American chemicals" and which he ranks among the important factors in industrial progress.

Poetry in the Dyehouse

THE picturesque writer who has been describing the chemicals used in the dyestuffs industry in the *I.C.I. Magazine* concludes this month with some notes on the fast dyes, which again demonstrate that a sense of the poetry of dyestuff manufacture may survive even the atmosphere of the dyehouse. Speaking of that important feature, fastness to light, he says: "Your undies rarely see the sun, but they must stand the rigours of the wash-tub; your spring coat must not fade before the fashions change; your cretonnes and your casement-curtains may need to resist possibly both the laundry and the bright sun for season after season. Thus, whether or no this or that frabric will fade in the sun is always a preoccupation in the home. Now, some dyes are very much faster to light, as the phrase goes, than others, and many of these specially valuable 'fadeless' dyes belong to a special chemical class. Without again disturbing you with fearsome chemical technicalities, it can be said that this particular class is related chemically to the coal-tar anthracene mentioned earlier, that is, that these dyes can be built up from anthracene in much the same way as our other dyes are built up from benzene and naphthalene. But nowadays they can also be made, more cheaply in fact, from benzene and naphthalene," a change in process that proved of very considerable advantage to those engaged in the production of such dyes.

And what could be nicer or more discerning than this description of the unsuspected chemicals we carry about with us daily? "It is, you will find, amusing and interesting to reckon out and realise how diverse are the origins of the materials you carry about with you even as dyestuffs. In the half-ounce or so of dyes on a blue suit or costume there may be repre-

sented perhaps a quarter of an ounce of aniline, the equivalent of about 2 lb. of coal-tar ; some fraction of an ounce of sulphuric acid, containing sulphur from Sicily or the pyrites of Spain ; some similar quantity of nitrogen, now chemically combined in the dyestuff, but perhaps once part of the wind blowing down the valley of the Tees ; even perhaps some "methyl," possibly once, and not so long ago, part of a sturdy beech, possibly, like the aniline, part of a Yorkshire coal seam. There, that is the whole story ; if you want to know more, you must turn to the proper books. You can begin with history and read most interestingly of Faraday and the early days of coal-tar ; of the young Perkin and the surprising result of trying to make quinine in the laboratory ; of Griess, the Burton brewery chemist, and his hobby ; and of Kekule, who dreamed of rings of atoms on the top of a London bus, and thus provided the scientific basis for a most intricate creative industry, a basis expressed by the chemical symbol after which Hexagon House is named." All this poetic feeling, we suspect, comes from locating industries near romantic spots like Boggart Hole Clough !

H. G. W. on Lord Melchett

In the *Realist* for September there is an article by H. G. Wells in which he makes the interesting confession that in his recent work *The World of William Clissold* one of the leading characters is based on Lord Melchett. "For some years now," Mr. Wells writes, "my interest in Lord Melchett has been undisguised. His public energy and his exceptional expressiveness have made him for me the typical modern creative business man. I have written about him here and there, and it would be stupid to pretend that Romer Steinhart and Co., in *The World of William Clissold*, would ever have been thought of if the system that centres upon Brunner, Mond, and Co. had never existed. That is not to say that Romer Steinhart and Co. is a picture or caricature of that reality, or that there is any portraiture about the story or 'personalities' as people say, but it is clearly an attempt to deal with the inevitable growth and possible developments of a huge industrial and financial complex in relation to social and political processes that could only have been made with the stimulating fact of Brunner, Mond, and Co. before the writer. In my book, which pretends to be the intimate autobiography of a partner in such a complex, a partner whose activities have been mainly scientific and industrial, the idea is put with as much force as possible that such great complexes already transcend the boundaries of existing sovereign states and that they make for a single economic world organisation—for Cosmopolis, that is, and not for Empire."

Chemical Engineering Progress

The list of members to July 1, 1929, just issued by the Institution of Chemical Engineers, is another reminder of the astonishing and well-ordered progress that this organisation has made since its establishment as recently as 1922. The list occupies 53 pages, and is very well arranged and complete in its information. It contains the names of the three past presidents and the present members of council, and in the case of the honorary members, members, associate-members, graduates, and students the information includes the date of election, academical and other distinctions, postal and telegraphic addresses, and business and home telephone numbers.

A geographical analysis of the membership shows that the great majority of the members come from England, London naturally being the strongest section. Scotland, Wales, and Ireland, however, supply their groups. Under the head of British Dominions, Africa, British West Indies, Canada, British East Indies, India, Australia, New Zealand, and Egypt are represented. Seven states in the United States of America contain members, and the membership further extends to the Argentine, Peru, China, Iraq, Persia, Belgium, Denmark, France, Germany, Holland, Italy, and Switzerland. The total membership is returned at 563, a very satisfactory figure considering the severe standard of admission on which the Institution has wisely insisted, and the fact that, in the short space of seven years, the Institution should be represented in virtually every quarter of the globe is a result in which the organisers are entitled to feel a real pride. The Institution, for which the Chemical Engineering Group prepared the way and still helps as a valuable auxiliary, stands as one of the best pieces of constructive organisation associated with modern chemical industry.

Reparations

In the address by Mr. Philip Snowden, broadcast on Monday evening, on the results of the recent Reparations Conference at the Hague, there was one reference that would be appreciated in the chemical industry. That was the reference to the injury to British trade that might be done by the payment of reparations in kind. The best-known case is that of reparation dyestuffs, large quantities of which were at one time in the hands of the Board of Trade, and were offered for sale through a marketing agency. The scheme was not a great success, and there were large stocks available for which there was no very marked inquiry. Nothing has been heard of reparation dyestuffs for some time, but the experience was sufficient to show the disadvantages of liquidating obligations by means of products of the class manufactured by creditor countries and, therefore, in competition with the domestic industries of those countries.

The Calendar

Sep. 9–12	Institute of Metals: Autumn Meeting.	Düsseldorf.
10	Iron and Steel Institute: Autumn Meeting.	Newcastle-upon-Tyne.
11 &12		
17	Iron and Steel Institute: Additional Meeting. 6.30 p.m.	Secondary Schools, Doncaster Road, Scunthorpe.
18, 19	Ceramic Society: Refractory Materials and Building Materials Sections Meetings. 9.30 a.m.	Midland Hotel, London.
26	Iron and Steel Institute: Additional Meeting. 7.30 p.m.	Chamber of Commerce, 95, New St., Birmingham.
Oct. 14	Ceramic Society: Pottery Section. Paper by Mr. H. E. Wood on his visit to America. 7.30 p.m.	North Staffordshire Technical College, Stoke-on-Trent.

America's Bid for Foreign Chemical Markets

The Science of Marketing American Chemicals

Below we publish the substance of an address delivered by Mr. C. C. Concannon, chief of the Chemical Division of the Bureau of Foreign and Domestic Commerce, Washington, at the Convention of the International Advertising Association held during August in Berlin. Mr. Concannon, who is on a visit to Europe, is engaged in a study of European conditions, especially in relation to chemical industries. In this paper he discusses "merchandising methods that have advanced a relatively new industry to a dominant position in the domestic and world markets."

SINCE 1922 when business generally was at low ebb in the United States, the American chemical industry has advanced to a position of importance and is to-day enjoying a period of prosperity. The International Economic Conference of the League of Nations is authority for the statement that the United States is the largest single factor in the world's chemical industries—accounting for approximately one-half of the world's five billion dollar output of chemicals and claiming an increasingly large share in the billion dollars' worth of chemicals that annually enter into foreign trade. In contrast with the community marketing methods of the cartel system, the American chemical industry has reached its present position through an individualism that is the direct antithesis of the European conception. To point out the underlying basis of these merchandising methods and their close relation to the activities of the U.S. Department of Commerce is the purpose of the present discussion.

Older Selling Methods Obsolete

American chemical manufacturers, as in other lines of industry, have come to realise that the older selling methods must be replaced by carefully studied marketing policies and plans, directed along productive channels and supported by adequate sales promotion. Underlying all of this procedure is the necessity for exact knowledge—first of products, then of markets, buying habits and types of buyers, distribution methods and sales organisation.

President Hoover aptly summed up and expressed the situation in these words: "To create a sense of need abroad for our particular goods—to induce the purchase of them—is a science in itself."

Chemicals are seldom sold directly to the public. Rather they are industrial raw materials made by one industry and consumed by another in the manufacture of a product in which the identity of the original chemical may be lost entirely. It is this relation that puts the merchandising of chemicals squarely into the field of industrial marketing, where there are certain principles that are common to the solving of practically all merchandising problems. These principles are four in number. First, there must be the determination of the market and its analysis on the basis of potential volume and profit. Second, the buying influences must be studied to ascertain which men control purchasing of the product and how it is bought. Third, there must be the sales organisation and the machinery for approaching the market efficiently and economically. Fourth, and finally, there must be developed the selling appeals and sales promotion that relate the product directly to the self-interest of the buyer.

Many American manufacturers, including a number in chemical industry and a great many more in the field that supplies chemical engineering equipment and accessories, have found it convenient to develop their marketing policies and plans in the form of ten simple steps. No particular novelty is claimed for this procedure, but since it is, in a way, typical of American marketing methods in general, I should like you to consider this succession of steps in their relation to the chemical industry.

The Choice of Markets

1. *Markets.* Reduced to its elements, this first step is merely the cutting of the goods to fit the cloth. In other words, the manufacturer analyses the logical markets for his products and then rates them according to their size, importance, and the potential returns from each industry. The chemical manufacturer begins his study with an analysis of his present sales by products in order to get a clearer idea of the relative demand for his output. Then follows an analysis of product sales with reference to the margin of profit in each in order to make certain that sales effort on each product is not out of proportion with the returns. Profits are sometimes sacrificed for volume without the manufacturer realising the futility of that effort. But once the products are selected that promise the greater return, there must be still another sales analysis to determine the industries in which these can be sold most profitably. Too often a manufacturer finds that he has been wasting time and effort in selling to industries where the potential prospect is not sufficiently large to repay him for the development. In other cases selling costs may be prohibitive, due to inaccessible markets, uneconomic buying practices or special sales resistance.

So far the manufacturer has been studying his past limitations as revealed by his own sales records. To measure his future prospects he must make use of an outside yardstick and for this purpose he probably uses the figures of the U.S. Department of Commerce or the current statistics compiled by the trade associations, technical periodicals and various business bureaux. Fortunately in recent years the biennial statistics of the Census of Manufactures have been available in sufficient detail to enable the manufacturer to break down the basic industry figures in order to show the size of establishments, number of employees, or the number of motors and horse-power employed in manufacturing. These detailed figures are extremely helpful in rating the market in relation to the number of worth-while prospects.

Studying the Buyer

2. *Types of Buyers.* Having set up the markets on which the chemical manufacturer is to concentrate his sales efforts, he turns to the study of the buying influences on the products he has to sell. He can well ask himself such questions as the following:

Who in each plant of my customers is directly charged with the responsibility for the processes in which my products are used? Whom do my salesmen have to convince of the quality of my products? From whom does the order come? Who originates it? Who specifies the brand or manufacturer? Is buying done by individuals or by groups? If the latter, which men and how many men by title and responsibility must I reach with my sales story? How can I reach these men most effectively?

If in answering these questions the manufacturer is willing to go behind the scenes and seek out the real buyers by actual operating responsibilities rather than by titles, he will greatly have simplified his marketing problems.

It has been said many times that the chemical industry is its own best customer. The explanation for this statement is found in the unique degree to which the chemical industry is self-contained. The finished product of one branch of the industry often becomes the raw material for another. Thus, the tar distiller produces a distillate that is refined by a chemical manufacturer and sold as a coal tar intermediate to other manufacturers for the production of dyes, explosives, rubber accelerators, plastics or photographic chemicals. The fertiliser manufacturer makes sulphuric acid, sells it to the coke plant for making ammonium sulphate, which is returned to the fertiliser plant for use as an ingredient in mixed fertiliser.

From the marketing viewpoint this close interrelation means that the chemical manufacturer must address his sales story to the same type of man who in his own plant is responsible for production. Thus maker and user speak the same language and are guided by the same knowledge of quality, properties, and behaviour. This proves of mutual value in the drawing of specifications and the framing of chemical contracts.

Prospects and Sales Organisation

3. *Prospect List.* Building and maintaining a list of men who control buying in each industry is the next step in marketing. After the type of buyer has been determined, the compilation of the list becomes a matter of recording names obtained from reports of salesmen, trade directories associations, and society membership lists. Prospect lists age rapidly and to be of value must receive continuous attention.

4. *Sales Organisation.* At one time chemicals in the United States were sold almost entirely through middlemen known as brokers or sales agents. Government regulation, quota allotments and other conditions of the war period brought the manufacturer for the first time into close relationship with his customers. Since then practically the whole American chemical industry has gone over to direct selling. The manufacturers have had to build competent sales organisations to supply the service needs of the consuming industries. In selling technical products such as chemicals specialised knowledge of the buyer's problems is an absolute necessity. Thus sales engineers and technically trained service men are required to supplement and round out the work of the sales organisation.

5. *Territorial Plan.* After the manufacturer has selected the markets on which he is to concentrate his selling effort, his territorial plan consists merely in setting up his sales organisation in strategic locations to serve those markets most economically. The necessity for warehousing facilities and other arrangements for prompt and efficient shipping will also have a relation to the setting up of the sales territories. Many chemical manufacturers concerned with national distribution have found that the eight geographic zones corresponding to the principal freight rate territories of the Interstate Commerce Commission offer convenient units in which to break down their territorial problems. One table classifies the business into nine industries—textile dyeing and finishing; cotton manufacturing; chemicals; petroleum refining; paints and varnishes; soap; paper and pulp; glass; explosives—and gives the percentages of trade for each territory.

6. *Personnel.* This is closely allied to Step 4 that I need only emphasise the increasing importance of having men with selling experience, supplemented and supported by technically trained specialists in research and engineering who can, if necessary, supply the buyer with the how, why, and wherefore in the application of the products within the customers' own plant.

7. *Publication advertising.*

8. *Manufacturers' literature.*

9. *Special promotion.*

10. *Sales keynote.*

Trade Journal Advertising

The remaining steps have to do primarily with sales promotion. To complete my picture, I would remind you briefly that in the chemical field we have the engineering type of publication read by the men responsible for production, the research and scientific journals that serve the laboratory and research departments, and the trade and market papers that carry the news and current price changes of the industry. In addition, in the allied and consuming industries, such as textiles, petroleum, paint and varnish and paper, there are many excellent industry publications that serve all interests within their more limited fields. Under the heading of "Manufacturers Literature" comes the usual range of catalogues, engineering handbooks and direct mail literature. Chemicals, *per se*, are not products that lend themselves to dramatic and spectacular advertising. Rather, the manufacturer often finds it desirable to prepare and distribute highly technical data and reports on the properties and qualities of his materials, supplemented by flow sheets and working diagrams to educate the prospective customer in the profitable use of those chemicals within his own plant. Much of the manufacturers' literature in the chemical field is of this character.

Special promotion, as it is interpreted here, refers to the use of exhibits at the biennial and other expositions of chemical industries, the preparation of papers for conventions of engineering and scientific societies, talks at trade association meetings, sales conventions, etc. Chemical industries in the United States, because of a secretiveness inherited from earlier days, have done less along these special lines of promotion than have the equipment and accessory manufacturers within the same field. It is evident, however, that as the industry grows it must make greater use of all modern tools of sales promotion.

The Self-Interest of the Buyer

The last step in our marketing programme, and one which can conceivably be the most important, is the development of the proper sales appeals. It is fundamental that these must tie the product directly to the self-interest of the buyer. Fear of loss or hope of gain will always have determining influence in chemical buying, and the American manufacturers who have marketed their products most successfully have always driven home the ideas of improved operation, increased production, and lower costs which result from better quality, performance, and technical service.

If we could evaluate all of the factors that have contributed to the remarkable growth of the American chemical industry within the past six or seven years, I think we should find that the dissemination of knowledge regarding new products and processes, foreign trade and market developments, production and distribution underlies all of our industrial progress. And among these important factors is advertising, which has a great influence on the marketing of American chemicals.

Benzyl Alcohol

Some Notes on Its Production

BENZYL alcohol is one of the few aromatic alcohols that have attained a definitely important place in chemical industry. Its esters, such as benzyl benzoate, benzyl valerate, butyrate, acetate, etc., are substances of considerable importance in the perfumery trade, and to a considerable extent in the preparation of various cellulose acetate and nitrate lacquers and varnishes. In fact, it was the use of benzyl alcohol and its derivatives in the preparation of "dopes" for aeroplane wings which led in the first place to the manufacture of benzyl alcohol in this country during the war; prior to 1914, all benzyl alcohol was imported. In addition, certain of the benzyl derivatives are employed in medicine.

There is only one method by which benzyl alcohol is prepared commercially, namely, the chlorination of toluene followed by conversion of the benzyl chloride so formed to benzyl alcohol by suitable methods of hydrolysis. The disadvantage of this process is that it is very difficult to arrange the chlorination so that benzyl chloride is produced to the exclusion of higher chlorinated compounds such as benzal chloride and benzotrichloride. These compounds are usually worked up into benzoic acid.

Chlorination of Toluene

The toluene is boiled in enamelled pans under a reflux condenser and chlorine is passed in, the heating being carried out by steam coils employing steam at a few pounds pressure. The hydrogen chloride evolved is, of course, absorbed in water, and the amount of chlorine used is weighed by difference from the tanks in which it is supplied. Very little of the chlorine escapes absorption. The crude mixture is fractioned in spherical lead-lined stills, provided with a forty-foot column and the distillation is conducted under reduced pressure.

In the early days of the manufacture of benzyl alcohol, considerable difficulty was met with in the maintenence of the reduced pressure in the sills, owing to the corrosion of the extractor parts by the chlorine and hydrogen chloride given off during the early part of the distillation. In one instance, when the demand for benzyl alcohol was urgent, this difficulty was overcome by the construction of a giant earthenware filter pump which was connected to the hydraulic main. The problem, however, is one which is comparatively easily solved by present-day chemical engineers. Stills for benzyl chloride are provided with condensers, the lower part of which is water cooled; and the quality of the distillate is ascertained by means of drip-boxes containing hydrometers, and furnished with glass windows. The first runnings, which consist of unchanged toluene, have a density of 0·87–0·99; but the range from 1·0–1·15 represents comparatively pure benzyl chloride. The last runnings, the gravity of which exceeds 1.15, contain higher chlorinated derivatives. Pure benzyl chloride has a comparatively pleasant smell, and boils at 176° C.

Hydrolysis of Benzyl Chloride

The hydrolysis of benzyl chloride to benzyl alcohol proceeds very readily on boiling with sodium carbonate solution under reflux; the end of the operation can be determined by the disappearance of the odour of benzyl chloride, after which the benzyl alcohol may be recovered by simple separation, and purified by distillation. Benzyl alcohol, $C_6H_5CH_2OH$, is a pleasant-smelling liquid (b.p. 206° C., insoluble in water), which occurs naturally in the form of its benzoic and cinnamic esters in Tolu and Peruvian balsam, and also in storax.

Nitrocellulose Lacquers Industry

American Influence in French Trade

MR. A. D. CAMERON, United States Vice-Consul in Paris, in a report on the "French market for nitrocellulose lacquers," published in *Commerce Reports*, states that in late years France has been one of the leading customers of the United States for nitrocellulose lacquers, enamels, and varnishes. Certain indices, however, lead to the conclusion that the French industry is now adequate to supply its own requirements for these products, owing to the availability of American capital, processes, and raw materials. French producers, moreover, are located principally in the vicinity of Paris and have the advantage of obtaining semi-manufactured nitrocellulose pastes from neighbouring sources.

Automobile Industries

All the automobile factories in quantity production, with the possible exception of Peugeot, use sprayed nitrocellulose lacquers on their stock models. The leading body works in Paris and vicinity use sprayed lacquers unless customers demand varnished coach work. For the manufacture of airplanes a better and more uniform quality of spraying lacquer is required than for the automotive industry. Spraying lacquers also are used for the interior decoration of buildings and steamships, for certain types of store furniture, and for a few industrial products made of wood, steel, ebonite, or plastic materials; but when comparatively small surfaces are to be covered, brushing lacquer generally is preferred. Brushing lacquer, which comprises one-fifth of the total consumption, ranks midway between oil paint and varnish as regards price and utility. It is sold usually in very small containers through the regular paint trade, although some direct sales are made to large industrial concerns.

Two French firms, subsidiaries or licensees of the producers of the leading American brands, now have manufacturing capacity adequate to supply the requirements of France and its colonies. One obtains its raw materials from a chemical enterprise allied with its parent company, and, in fact, shares its manufacturing premises, while the other handles the complete operation from the basic raw material—such as cotton linters and nitric acid—to the finished product. Unless some unforeseen event occurs, it is expected that these two firms soon will have considerably more than the 60 per cent. of French business which they are said to control. Another French concern, entirely controlled by American capital, produces a popular high-grade lacquer, made in different consistencies for brushing and spraying. Compagnie Française de Zapon is the only enterprise advertised as purely French which has complete manufacturing facilities. Its capital, however, is largely from foreign sources. "Nopaz," its leading product, is very satisfactory for automobile tops, cushions, and Weymann bodies in artificial leather; its brushing lacquer has a fair sale; and the company also sells colourless nitrocellulose paste to a number of French lacquer factories. "Ripolac," a brushing lacquer, produced by a joint subsidiary of the Franco-Dutch concern, Ripolin, and Lefranc, the leading French paint and varnish manufacturer, is carried in stock by practically all retail paint stores.

Use of Waste Materials

One of the Franco-American firms uses as raw material scrapped black powder, apparently of American origin but obtained from the Government powder monopoly. Its employment necessitated the installation of a special process to dissolve the nitrocellulose. Another waste material used is worn-out motion-picture film. The celluloid and acetate types seem to be used indiscriminately, probably because there is so little of the latter available that its admixture is of no importance. The greater part of the raw material, however, consists of cotton linters, imported principally from the United States. One of the leading exporters has a direct selling branch at Paris and has succeeded in furnishing French chemical, explosives, and varnish works without the intervention of the usual brokers or jobbers.

A somewhat large volume of sales is secured by the only English brand of nitrocellulose lacquer on the market—manufactured by Lewis Berger and Sons. German nitrocellulose lacquers invaded the French market as a result of the French tariff schedule of 1927, which granted Germany a new minimum rate on the commodity. The I.G. Farbenindustrie at first made progress with "Nitrolac," selling at 40 francs per kilo, but sales declined when the product failed to meet tests of French automobile manufacturers. Recently, another German nitrocellulose lacquer, "Glasso," made by Glasuritwerke A.G., of Hamburg, was placed on the market. Its current price is 36 francs per kilo, while the special thinner sells at 16 to 18 francs.

Only the leading automobile and airplane manufacturers and the higher-class custom body builders specify a coating which is guaranteed fast in colour and free from flaws for a year after application. Other purchasers buy the cheapest material available for their purpose. All the leading brands are liberally advertised in technical and trade papers.

A Bookman's Column

The firm of Sir Isaac Pitman and Sons, Ltd., has just published the fourth and final volume of a *Technical Dictionary of Engineering and Industrial Science* in seven languages, English, French, Spanish, Italian, Portuguese, Russian and German, edited by Ernest Slater, M.I.E.E., M.I. Mech.E. Chemistry is dealt with among numerous other subjects. The complete work runs to 2,230 pages, price £8 8s. The words are arranged on an English alphabetical base, the foreign equivalents being then given. Prefaced to the dictionary are various sections intended to act as a guide to technical translators, which deal with the following subjects: The art of technical translation; alternatives, refractory idioms, and peculiar phrases; adopted words; mechanical motion, relation, position, cause and effect; and a guide to common engineering abbreviations.

Among recent German publications is a textbook of general chemical technology, entitled *Betriebsmittelkunde für Chemiker*, by M. Dolch, director of the University Institute for Technical Chemistry at Halle (Leipzig: Otto Spamer, pp. 336, paper, R.M. 18, bound, R.M. 20). The first part of the book deals with the movement of material (devices for transporting solids, liquids, gases and vapours); and the second with the transformation of material (transformations of a mechanical-physical kind, and those due to application or removal of heat). The text is illustrated by numerous diagrams.

Under the editorship of Dr. Alfred Wagner, A. Hartleben's Verlag, of Vienna, is proposing to publish a comprehensive treatise (in German) on perfumes, *Die Riechstoffe und Ihre Derwate*. The first section will deal with aldehydes, and the first part of this section, *Aldehyde der aliphatischen Reihe* (pp. 404, paper covered, R.M. 25) has just appeared. It is written by Dr. A. Wagner in collaboration with M. Burger and Professor F. Elze, and deals exhaustively with the occurrence, preparation, physical properties, chemical behaviour, reactions, detection and investigation of the natural and synthetic aldehydes of the aliphatic class.

Early this year the Faraday Society held a general discussion on "Crystal Structure and Chemical Constitution." A very eminent authority, Professor V. M. Goldschmidt, delivered a lecture on the subject, which was followed by a series of papers and discussions on its various aspects (inorganic compounds, organic compounds, metals and general). The whole of these proceedings now appear in one of the familiar green-covered books (Gurney and Jackson, pp. 170, 8s. 6d.). Among those who presented papers were numerous British and foreign investigators, e.g., the Braggs, Westgren and Phragmén, Jaeger, Astbury, Ewald, etc.

The Science Museum of London has issued, in its series of Handbooks of the Science Museum, a monograph on *Industrial Chemistry*, compiled by Mr. A. Barclay (H.M. Stationery Office, pp. 83, 1s.). About half the monograph is devoted to an account of the history of the subject, ancient, mediæval and recent. The other half gives a detailed account of the exhibits in the Museum connected with industrial chemistry. The exhibits described number 94, and include models of plant, objects of historical interest, etc.

The Carbide Industry

An Examination of the International Position

THE question of overproduction of carbide has become acute once more in connection with the impending development of Dalmatian water-power by a French company, Phosphates Tunisiens. A correspondent of *The Manchester Guardian Commercial* has recently discussed the subject at some length. The concessions hitherto held from Jugoslavia by the Sufid, a subsidiary of the Italian Terni, have, (he says) passed to the new company formed by Phosphates Tunisiens, known as Sefied ; and a very comprehensive plan for the increase in the production of current in Dalmatia from the present 110,000,000 k.w.h. to 900,000,000 k.w.h. is bound up with the change-over. The intention is to found in Dalmatia an electro-chemical and an electro-metallurgical industry comparable with those of Norway. Nitrogen products, super-phosphates, and especially carbide—particularly calcium carbide and cyanamide—are to be produced in enormous quantities at a capital expenditure estimated at 450,000,000 francs.

Importance of the Plan

The plan, which is being strongly backed by the Jugoslav Government, is likely to be of critical importance to the carbide market ; even at present, according to expert opinion, the overproduction of carbide is only avoided with difficulty. Since the technical production of carbide from chalk and carbon was begun by means of the electric furnace in 1894, electrification has made such enormous progress that in many instances carbide has become a mere by-product of the consumption of the main current supply. Before the world war, with the wagon and locomotive industries, the armaments industry, naval and commercial shipyards, engineering works and building enterprises much better engaged than nowadays, the world consumption of carbide and acetylene for cutting and welding and for lighting and heating, together with certain chemical uses, was estimated at an aggregate of 375,000 metric tons, and the production was only slightly more than this.

Naturally the immense consumption during the war rapidly sent up the production of carbide, and in the first years after the war it even increased further, owing to the requirements for welding and cutting in the conversion of the old munitions, breaking up of warships, destruction of fortresses, and reconstruction of devastated areas. To-day the world productive capacity is scarcely less than 2,250,000 tons. (A kilogram of carbide requires about a kilogram of lime, 0·7 kg. of carbon, and 3 to 4 k.w.h. of electric energy.) The world capacity increases from day to day, and the world consumption is only about 1,500,000 tons. Lighting is of virtually no significance to consumption, and sales now depend mainly on the calcium nitrate industry and other chemical processes, together with the old uses for welding and cutting. Lately consumption has further increased through the requirements for the production of acetate rayon—involving the preparation of great quantities of acetone and sulphuric acid—and the considerable use of tetrachloride derivatives as solvents and so on. This applies even to Germany, where the calcium cyanamide produced (500,000 tons) requires 400,000 tons of carbide, and other requirements of carbide must be estimated at not less than 110,000 tons.

Methods of Regulation

It was these conditions, together with the threatened inundation of the German market with carbide from other countries which must at all costs export, that led to the German adhesion not long ago to the international carbide syndicate, which until then had been aimed particularly against Germany. The syndicate has been joined by Norway, Switzerland, Sweden, France, Jugoslavia, Austria, and Italy, and has been trying to regulate market conditions in Britain (which has not a well-equipped carbide industry), Holland, and elsewhere—the markets, that is, which can take big quantities of carbide but are hotly contested. Up to now the syndicate has had a tough struggle for existence in competition with outsiders, although a big part of the world output is required for nitrogen production and does not require watching. It is also no easy task to combat the potential overproduction of the means of production. The water-power stations are expensive to construct, but soon pay for themselves, and, as we have seen, carbide production becomes merely subsidiary to the production of electrical energy.

On the whole carbide prices are not high in comparison with pre-war, and for this reason the countries with the more recent and better equipped installations are better placed for profitable working than the countries dependent on older installations or on coal-produced electricity. Germany, for instance, has a conventional Customs duty of five marks a metric centner, reduced to 4·50 for Switzerland ; and the German manufacturers have repeatedly declared that in spite of international syndication they could not well dispense with the five-mark duty. This is mentioned as an indication of the situation.

The Producing Countries

The principal producing countries and their capacity as far as ascertainable may briefly be mentioned. The United States and Germany are probably the biggest producers, but it is convenient to begin with Norway. Norway has the advantages of ample water-produced electricity and a good customer in Great Britain. This explains the great expansion in the carbide industry during and since the war. The industry is closely united with the ferro-metallic and the whole of the electro-metallurgical and electro-chemical industries ; its expansion was so great that after the war there came an acute crisis, in the course of which the American Electric Furnace and Products Co. had to close down the power station at Sande Falcone, and the Alby United Carbide Co. (Odda) and the North Western Cyanamide Co. also ceased operations. The rest of the works, led by the A/S Hafslund in Oslo and the A/S Meraker Elektrisk Kraft og Smelteverk, and including the Odda Smelteverk (which works in association with the two first named), the Notodden calcium carbide works, and the Norsk Elektrokemisk A/S in Kangerö, have done tolerably well, but the existing Norwegian production is no more than 70,000 tons out of a capacity of 105,000 tons a year, although Great Britain continues to buy on a big scale. Even so, Norway exports to Britain about 2½ times as much as Germany, though the figures vary.

Swiss and French Conditions

The situation is less favourable in Switzerland, in spite of long experience and equally rich sources of water-power. The production is about 35,000 tons a year, a considerable number of firms competing, including the Lonza A.G. (Basle), the Société des Produits Azotés, and the Elektrochemische Werke (Berne) ; capacity is considerably above this figure. France has an equal interest with Norway and Switzerland in the export of carbide, and a growing interest. She has been proceeding on a regular plan with electrification in the south (Pyrenees and Alps), the central massif, and the north, and has become a keen competitor in the world market in this and other electro-metallurgical fields. Conflicts are thus bound to arise in connection with the participation in Jugoslavia's carbide industry. No fewer than 23 important firms are occupying themselves at present with the manufacture of carbide in France, including the Manufactures etc. de St. Gobain, the Société d'Electrochimie, etc. d'Ugine, Bozel Malétra, the Péchiney, the Aciéries et Forges de Firminy, and so on ; the works are mostly in the departments of Savoie, Isère, and Hautes Pyrénées. The French industry has a capacity of some 250,000 tons a year.

Naturally there is not the same degree of concentration in the French chemical industry, which is of more recent growth, as in the German. In Germany the great dye trust, the I.G. Farbenindustrie, controls a big proportion of the whole of the country's production, partly through its many participations ; in the thirteen principal works the name of Dr. Alexander Wacker crops up again and again as holder of a block of shares. As the leading producer of nitrogen the I.G. is able to throw on the world market a big surplus of carbide. In Italy, too, there is less concentration in the carbide industry ; Montecatini and Terni—the latter is now extending its activities—account for a considerable proportion of the aggregate capacity, but at least fifteen other firms are competing in carbide production

for the market. The aggregate capacity is probably about 200,000 tons a year, and only a fraction of this is utilised.

The United States and Canada

No estimate can be offered of the productive capacity in the United States, but the consumption in the chemical industry is increasing rapidly, as in Germany. The American consumption, apart from nitrogen, is probably some 50,000 tons more than in Germany. Among important producers are the Shawinigan Products Corporation, the Carbide and Carbon Chemical Corporation, the Union Carbide Co., two firms in Duluth (Min.), and one in Carbondale (Pa.), but this is far from completing the tale of producers. In Canada the Canadian Calcium Carbide Co. uses the Niagara Falls as its source of energy; in addition to this firm there are the Canada Carbide Co., in Montreal, the Ottawa Carbide Co., the Canadian Electro Products, Ltd. (Shawinigan combine), and other important firms. It is unnecessary to mention Canada's enormous capacity owing to her resources in water-power; it is all the more difficult to estimate it. Present production may be valued at 10,000,000 dollars a year.

In Europe, Poland has benefited greatly in carbide potentialities by her acquisition of the former German works of Chorzow and Carbid Wielkopolski (Bromberg); the carbide production per furnace has been increased by about 50 per cent. in the last five years. Production is over 100,000 tons a year. In Czechoslovakia the Verein für Chemische Industrie (Aussig) and Weinmann and Lobkowitz together have a capacity of over 50,000 tons a year. In Russia the industry is still in its infancy. Spain and Rumania (which has the advantage of methane energy) have each a capacity of perhaps 25,000 tons a year; Jugoslavia's capacity may be taken as about three times as much, and that of Austria and of Hungary about half.

New Waterworks for Canton

Scientific Processes for the Far East

MODERN methods of towns water purification are a striking example of the co-operation of the chemist and the engineer, and the fact that China is now waking up very effectively is shown by a contract that has been signed by Dr. Wu Pak-Liang, Commissioner of the Canton Municipal Waterworks, and the Mayor of Canton, Mr. Lam Wankoi, with the Jardine Engineering Corporation, Ltd., of Hong Kong. This is for the installation of a "Paterson" patent rapid filtration plant at Canton, to deal with 10,000,000 gallons of water per 24 hours, on the latest scientific principles of sterilisation and continuous treatment.

The raw water will be taken from the Canton River at Tsang Poo, about six miles from the City of Canton, and pumped to the "Paterson" patent rapid sand filters, the installation in this connection consisting of three electrically driven low-lift pumps, each with a capacity of 5,000,000 gallons of water per 24 hours, one being a stand-by. There will be a battery of 16 of these sand filters, operated in conjunction with the "Chloronome" apparatus for the sterilisation of the water by means of a measured trace of chlorine gas, and the whole installation is on the same general lines, for example, as the Shing Mun Valley scheme for the Hong Kong Corporation. There is also included coagulent treatment by means of alumina with four very large sedimentation tanks, having a total capacity of 1,200,000 gallons, allowing three hours' settling before passing to the sand filters. The total cost of the whole equipment, including the pumps, pipes, and other accessories, is approximately 2¼ lakhs of Hong Kong dollars, the contract having been secured for Great Britain in the face of severe foreign competition.

The general method adopted in such schemes, of which a large number are at work with suitable variations according to local circumstances, is to treat the raw water with lime and alumina coagulents, pass to settling tanks, and then to filter through rapid gravity sand filters constructed of ferro-concrete and filled with graded sand through which the water passes generally at the rate of 80 gallons per square foot of filtering surface per hour, being collected at the bottom by a large number of gunmetal nozzles. The clear water is then treated by the "Chloronome" apparatus which as a rule adds continuously about one part of chlorine gas to 2,000,000 gallons of water, although the exact amount is varied. A large proportion of London water is treated on these lines.

An I.C.I. Beacon-Light

THE above illustration, showing the installation of a beacon-light for Imperial Chemical House, London, is reproduced from the *I.C.I. Magazine* for September. Photograph by Fox Photos.

Production of Mercury in the United States

THE production of mercury in the United States in 1928 amounted to 16,838 flasks (75 lb. each). The calculated value, using the average price of mercury during the year, is $2,052,215. This is the largest domestic production since 1919, when 21,415 flasks, valued at $1,933,560, were produced, but is only approximately half as large as the average annual production for the period 1850–1921. The production in 1927 was 11,276 flasks, valued at $1,314,782. The average quoted price at New York for 1928, $123,506 a flask of 76 lb., is the highest ever recorded, with the exception of the average prices in 1916 and 1918. As usual, the largest production of any State was that of California, 6,711 flasks. Nevada produced 2,905 flasks; Oregon, 2,848 flasks; and Texas, Washington and Arizona together, 4,374 flasks. In addition to the above, 404 flasks of mercury were produced in Nevada from gold and silver pan-amalgamation tailings, compared with 226 flasks from this source in 1927. The principal producing mines in 1928 were the Sulphur Bank, Lake County; Knoxville, Napa County; New Idria, San Benito County; Oceanic, San Luis Obispo County; Cloverdale, Sonoma County in California; the B. and B. Quicksilver, in Mineral County; and those of the Nevada Quicksilver and Pershing Quicksilver Co.'s, in Pershing County, Nevada; the Opalite mine, Malheur County, Oregon; the Chisos mine, Brewster County, Texas; and the mines of the Barnum-McDonell Mercury Co. and the Morton Cinnabar Co., in Lewis County, Washington. In 1928, 15,583 flasks of mercury, valued at $1,572,017, were imported, compared with 24,650 flasks, valued at $2,189,495, in 1927. Of the 15,583 flasks imported in 1928, 6,189 flasks were derived from Spain, 5,718 flasks from Italy, 1,816 flasks from Mexico, 913 flasks from Belgium, 546 flasks from Germany, and 401 flasks from the United Kingdom. In 1927, 13,663 flasks came from Spain, 9,089 flasks from Italy, and 1,898 flasks from other countries. Production in the United States, plus imports, indicated 32,421 flasks made available in 1928, compared with 35,926 flasks made available in 1927.

Soap Dust Explosion Hazards

Experiments by U.S. Bureau of Mines

TESTS conducted at the Pittsburgh, Pa., Experiment Station of the United States Bureau of Mines, indicate that soap powder is, when suspended in air, a highly explosive substance, capable, under certain conditions, of causing a serious explosion.

Experiments with soap dust in suspension produced even more violent explosions than were attained with dry coal dust. The explosion hazard of soap dust is, of course, a serious factor only in the case of suspension of considerable amounts in air, such as might occur in the process of manufacture.

The U.S. Department of Commerce, through the Bureau of Mines, is frequently called upon to determine by laboratory tests the explosibility of suspensions in air of various dusts encountered in mines and elsewhere. Not all dusts which are combustible material will form explosive mixtures with air under ordinary conditions of temperature and pressure. A knowledge of the chemical composition of a dust, together with a determination of the size of the particles, often gives valuable indications. But in many cases actual explosibility tests are necessary. Although an explosion which occurred in a soap plant as early as 1890 was attributed to powdered soap, it is apparent that the hazard presented by powdered soap has not been generally appreciated. It is thought that no extensive investigation of the explosibility of powdered soaps has been made.

Manufacture of Soap Powder

It is only recently that pure powdered soap has been manufactured on a large scale. The familiar " soap powder " in the past was usually a mixture of soap with a relatively large quantity of sodium carbonate. Often it contained large amounts of moisture and abrasive material. Even a highly combustible dust when mixed with large quantities of inert dust will not form explosive mixtures with air. Pure powdered soap, however, presents a different aspect. Pure soap is formed by combination of alkali (incombustible material) with fatty acid (combustible material). Toilet soap may also contain a certain amount of glycerin and essential oil which, being combustible, influence the explosibility of the dust. Sodium compounds, however, are known to have a " cooling " effect on the flames of explosives. Whether the pure soap, sodium stearate for example, would form explosive suspensions with air might then be a matter for actual experiment to determine.

The soap dust tested may be considered, for all practical purposes, a pure soap. It contained no sodium carbonate, only 1 per cent. of inert material, about 1 per cent. free fatty acid and 2 per cent. of moisture. The particles were uniform in size, averaging about 0·05 sq. mm. in cross-section. A Pittsburgh coal dust, with which comparisons were made, contained no particles above 200 mesh per inch size, but contained an appreciable proportion of very fine particles.

Nature of Explosions

Although the relatively large size of the particles of soap would perhaps indicate it to be not highly explosive, the explosibility tests showed that in every case more violent explosions were obtained with the soap dust than with the coal dust. Thus, more flame and heat appeared and much more pressure was produced in the explosion flask with soap dust than with an equal weight of coal dust. Moreover, not so high a weight-concentration of soap dust is necessary to form an explosive mixture with air. Evidently suspensions of this soap dust become dangerous when the concentration is greater than about 0·1 gram of dust per litre. With finer dusts or more intense sources of ignition the explosibility hazards will be greater.

Necessary Precautions

The precautions which should be taken to prevent explosions of soap dust are briefly :—(1) Eliminate the presence of dust in places where there is a possibility of its being raised into a cloud in the air ; (2) Eliminate all possible sources of ignition ; (3) Where the presence of dust cannot be avoided keep the dust mixed or covered with sufficient inert dust so that any dust cloud which may be raised will contain enough inert material to render the mixture non-explosive ; (4) Where none of the foregoing expedients can be adopted, in closed apparatus such as grinding machines, maintain an inert atmosphere (nitrogen, carbon dioxide, or flue gas).

With care, most ordinary sources of ignition may be eliminated. However, there is an insidious source of ignition which frequently arises owing to the very presence of the dust cloud itself. Whenever the particles of most fine, dry dusts are rubbed against each other or against dry surfaces or blown by air currents, static electricity is generated. Conducting surfaces in contact with such dusts are often electrically charged to potentials of several thousand volts. Under such conditions electric sparks may pass from one conducting surface to another or to grounded parts of the equipment. These sparks of static electricity are frequently sufficient to explode dust clouds through which they pass. The additional precautions to be taken in this case are to humidify the atmosphere or provide metallic conduction in order to ground all static charges as fast as they are produced.

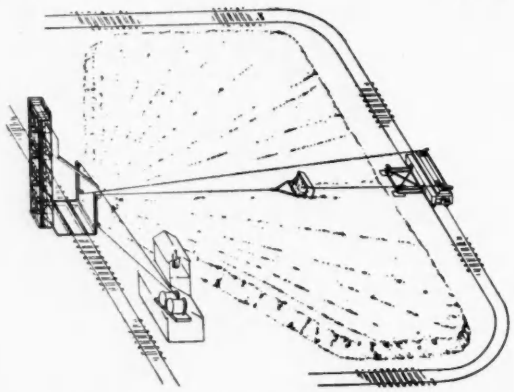
The results of these tests are given in Serial 2905, by David F. Smith and F. A. Hartgen, which may be obtained from the United States Bureau of Mines, Department of Commerce, Washington, D.C., U.S.A.

Drag Scraper Conveyors

A Notable Coal-Handling Plant

OF great interest as illustrating the latest practice in mechanical handling equipment, especially for coal as well as ash, and much general loose material such as lime, sand, and ores, is an installation that has been supplied to the Primitiva Gas Works in Buenos Aires by the Underfeed Stoker Co., Ltd. This is for coal, being " run-of-mine " bituminous, arriving at the works in railway wagons with discharge to a concrete track hopper below the ground level, from which it is conveyed either to a storage dump or direct to the retorts.

The general principle is, of course, the same for almost any kind of crushed material, and the equipment at Buenos Aires consists of an electric driven " Beaumont " automatic skip hoist with " Simplex " patent loader, which cannot be flooded or underloaded, for the continuously running small wagons or skips, taken up vertically by an endless wire rope, operated



SKETCH SHOWING THE PRINCIPLE OF THE " BEAUMONT " DRAG SCRAPER CONVEYOR.

by a 30 h.p. electric motor. The normal capacity of this skip hoist is 70 tons of coal per hour, discharging to an overhead steel plate bunker, the whole arrangement being carried by a girder work tower. From the bunker the raw coal discharges through an electric driven " Norton " coal crusher, also with a capacity of 70 tons per hour, driven by a 15 h.p. motor. This passes the crushed coal down to an endless mild steel belt conveyor travelling over the top of the retort setting, and discharging to any of the retorts as desired, the belt being 115 ft. long between centres, and 1 ft. 6 in. wide, running at 300 ft. per minute, driven by a 5 h.p. electric motor, with a capacity of 70 tons per hour.

Noteworthy is the coal storage dump arrangement adjoining the skip hoist, which discharges, by an overhead by-pass chute, in the opposite direction, any desired amount of coal to one corner of the dump, instead of to the " Norton " crusher and the belt conveyors. The Underfeed Stoker Co., Ltd., have taken over the sole manufacturing rights in Great Britain and the British Empire of all " Beaumont " mechanical handling appliances.

Chemistry and the Empire

The Industry's Place in British Development

MR. R. R. BENNETT, B.Sc., F.I.C., of London, a director of British Drug Houses, Ltd., was the guest of the Rotary Club of Chester on August 26, and addressed the members on "The Importance of the Chemical Industry to the British Empire." He stated that a flourishing chemical industry was essential to the strength of the British Empire in time of peace, and absolutely vital in time of war. He referred first to the contributions which chemistry had made to medicine. The health of the nation was to-day maintained at a higher level than ever before in the world's history, and this in spite of the ever-increasing nerve strain which resulted from modern conditions of business and social life. This improvement in public health was due partly to advances in hygiene and preventive medicine, but also it was dependent upon the use of the medicinal chemicals now available for the prevention and cure of disease. The production of insulin for the treatment of diabetic persons was mentioned as one of the recent contributions which scientific research had made to medical practice.

Germany and England

During the period preceding the great War, the development of a chemical industry in Germany was upon broader lines than in Great Britain. The industry was encouraged and fostered by the German Government. The chemical industry in Great Britain was unbalanced; the heavy chemical trade held its own, but fine chemical manufacture was neglected, and, broadly speaking, the pre-war capital and the commercial and research facilities of the chemical trade as a whole were inadequate to the importance of the industry. At the onset of war we had to rely upon our ability to improvise, but the chemical manufacturers rose magnificently to the occasion and supplied the British and Allied Armies with quantities of explosives and chemicals of all kinds which before the war they would not have been considered capable of providing.

The manufacture of dyestuffs was an essential element in British trade; it was a comparatively small industry, but it was a key industry upon which other large industries depended for their life. The textile trades in this country constituted the most striking and important group of industries in the civilised world. Textiles carried the British name and prestige to the uttermost corners of the earth. The existence of a very large part of our export trade in textiles depended absolutely upon there being at all times a sufficient supply of dyestuffs available for the use of trades.

The Mainspring of Industry

Chemistry was the mainspring of the vast majority of our industries, and very few manufactures could be carried on successfully without the chemist's help and control. By turning waste products to profitable account, by finding higher uses for low grade material, and by providing substitutes for diminishing supplies, chemical science had proved itself to be the most effective agency for the conservation of our natural resources. The better utilisation of natural fuel was pre-eminently a problem for the industrial chemist. In no direction could greater benefits to human welfare be sought than in the discovery of practical means of making all the valuable contents of coal available for man's use, instead of wasting a great part by primitive methods of combustion. The fixation of atmospheric nitrogen had led to an increased production of fertilisers that would be a vital factor in the period of intensive agricultural cultivation that awaited the world

As the result of chemical research, the world had witnessed the introduction of revolutionary methods into some of our most ancient industries. The complexity of modern life and the intense competition between nations now required that any industry, to maintain its place, must search out and apply the fundamental facts and principles with which its operations were concerned. Failure to do this spelt ultimate disaster. It was seldom that large savings could not be effected by the chemical control of raw materials. A considerable number of the larger industrial companies had found it profitable to conduct research upon the grand scale, and they were, almost without exception, conspicuous for their success. This was essentially the age of the application of science to industry, and research was at the root of the solution of the problems of every industry. The richest fruits of scientific discovery could only be reaped by the alliance of research with industry, and this was work of fundamental importance to the welfare of the nation.

"K.S.G." Low Temperature Carbonisation

Large Plant Operating at New Jersey

DURING the present year a number of important and extensive low temperature carbonisation plants will be in operation. Among them is the "K.S.G." plant at New Jersey, U.S.A., started up last March, this being the largest low temperature carbonisation plant so far set at work, having a throughput of 520-720 tons of bituminous coal dust and smalls per 24 hours. It is being operated by International Combustion Engineering Corporation, and there is being supplied on long contract a minimum of 3,000,000 cubic feet of towns gas per 24 hours, 535 B.Th.U. per cubic foot, to the Public Service Electric and Gas Co. of New Jersey, with normally 4,000,000 cubic feet.

Details of the Installation

The installation includes eight standard retorts, constructed by the Bethlehem Steel Corporation, of the usual design, being a very large rotary, slightly inclined, mechanically continuous, externally heated steel cylinder, 72 ft. long and 10 ft. diameter, having an inner cylinder 85 ft. long and 5 ft. 6 in. diameter, which carries the load. The complete weight of each retort is about 160 tons, the outer drums being made in three sections, the two end sections being $\frac{7}{8}$ in. thick, and the middle section 1 in. thick, with all the seams hammer welded under water-gas heating and annealed. Each seam is also reinforced by means of outer steel bands 2 ft. wide and $\frac{13}{16}$ in. thick, riveted and welded, while the inner drum is on the same lines, but much heavier, made of 1 $\frac{3}{16}$ in. plate.

The small coal enters the retort at one end and travels along the inner cylinder during 1$\frac{1}{2}$ hours, being raised to a temperature of 205-300° C. Afterwards the charge falls out through small apertures into the outer cylinder, which at this point is the hottest zone, about 495-550° C., and at the same time highly superheated steam is blown through the charge at this point, to the extent of about 100-200 lb. per ton of coal, so as to prevent undue expansion of the plastic charge. The low temperature carbonisation is completed in another 1-1$\frac{1}{4}$ hours' travel in the outer cylinder, the temperature slowly declining to about 430-485° C., while the speed is one revolution in 90 seconds.

Composition of Charge

A certain amount of the low-temperature fuel dust and breeze, not over 10 per cent., is blended in with the raw coal to prevent the plastic charge sticking, while for heating the setting producer gas is burned in a small firebrick combustion chamber, and the very hot gases at 1,300-1,700° C. are diluted, not with air, but with about 50 per cent. of the waste combustion gases, recirculated to give approximately 600-700° C., passed all round the retort.

The installation at New Jersey further includes a large water-gas equipment, which is used to supply blue water-gas, this being mixed with the rich low-temperature carbonisation gas to give the minimum of 3,000,000 cubic feet, as stated. In emergency, however, the water-gas plant can be operated as a carburetting installation so as to produce the desired amount of town's gas direct. The average yield per ton from the bituminous coal smalls used is about 3,900 cubic feet of very rich gas (800 B.Th.U. per cubic ft.), 4 gallons crude light oil, 30-33 gallons tar, and 14$\frac{3}{4}$ cwt. (73 per cent. of solid smokeless fuel with 12 per cent. of volatile matter.

Other large "K.S.G." plants approaching completion may be mentioned, those at the South Metropolitan Gasworks in London (one retort); at the Mines de Lens in France (one retort); the extensions to the original plant at the Matthias Stinnes 1/11 Mine at the Karnap Collieries, near Essen (two more retorts); and the installation at the Lukens Steel Works, Coatesville, Pennsylvania (6 retorts).

From Week to Week

RECENT WILLS INCLUDE: Mr. Henry D. Andross, of Kilmeny Bank Street, Irvine, late of the United Alkali Co., Ltd., who left £2,512.

LORD MELCHETT is the chairman of a Palestine Emergency Committee which has been formed to relieve destitution in Palestine. Over £40,000 has already been subscribed.

IMPERIAL CHEMICAL INDUSTRIES, LTD., have now established an office in Paris at 14, Rue Jean Goujon, in charge of Mr. L. W. B. Smith, formerly manager of their Vienna office.

HOPKINSONS, LTD., of Huddersfield, whose London office is at 34, Norfolk Street, Strand, London, W.C.2, announce that on and after September 2, their London office telephone number will be Temple Bar 4541 (three lines).

THE DOMINION BUREAU OF STATISTICS at Ottawa states that 13,531,300 lb. of aluminium blocks, ingots, etc., valued at $2,366,701 were exported from Canada in June, as compared with only 2,224,600 lb. worth $422,198 in May and 5,882,000 lb. valued at $1,153,833 in June, 1928.

BRITISH RAYON production figures in July are stated to have reached the record total of 5·73 million lb. This compares with a monthly average of 4·39 million lb. in the second quarter of 1929 and of 4·52 million lb. for the whole of last year. For July, 1928, the output was 5·1 million lb.

AFTER CORRESPONDENCE with Scottish Oils, Ltd., Glasgow, regarding an application for increase in general wages, Mr. Walter Nellies, general secretary of the National Union of Shale Miners and Oil Workers' Union, has replied that the sub-committee of the Executive Council has agreed to defer pressing for a meeting with the company's representatives until an improvement takes place in the shale oil trade.

THE TWENTY-FIRST MEETING of the Refractory Materials Section and the fourth meeting of the Building Materials Section of the Ceramic Society are to be held in London on September 18 and 19, the headquarters being the Midland Hotel, St. Pancras. Mr. Arthur Greenwood, M.P., Minister of Health, will be the principal guest at the annual dinner. In addition to business meetings and conferences for the reading of papers and discussion, visits have been arranged to the Building Research Station, Watford, and the National Physical Laboratory, Teddington.

PRESENTATIONS have been made at the works of J. C. Waddington and Sons, of Crown Point, Leeds, to mark the completion of 50 years' service by Mr. Peter Stapleton. Mr. Stapleton, who is 66 years old, was concerned with Mr. A. Wilkinson, who is still working for the firm at the age of 71, in dyeing for Windsor Castle curtains of Leeds-made Melton cloth. The curtains were dyed a dark ruby 30 years ago to the order of Queen Victoria, and are still unfaded. Mr. Stapleton also dyed the bright crimson cloth which was used to drape Westminster Abbey at the Coronation of King Edward VII.

THE SEVENTH annual report of the Safety in Mines Research Board (for 1928) has just been published (H.M. Stationery Office, price 1s. net). The report gives an account of the progress during the year of the researches which are being carried out directly under the Board, in collaboration with it, or with its financial assistance. The subjects of research include problems relating to coal dust and fire-damp explosions, the spontaneous combustion of coal, the safe use of electricity and explosives, falls of ground, and mine rescue apparatus. The report also contains an account of the progress of the health inquiries carried out under the supervision of the Health Advisory Committee, notably those into the effects of dust inhalation.

FROM THE BRITISH DRUG HOUSES, LTD., we have received a copy of a booklet which should be of considerable interest to all engaged in the improvement and maintenance of golf courses. It has been clearly demonstrated that the finest grasses grow best on sour or non-alkaline soil, such as is produced by repeated dressings with ammonium sulphate. It has been represented to us that it would be of great convenience to all green-keepers to have at their disposal some means for testing the soil so that they may see for themselves how they are progressing in the matter of keeping the soil acid. A relatively simple method for testing the soil is described in the booklet. British Drug Houses will be pleased to supply literature and any other particulars on request from any reader of this journal.

THE UNIVERSITY OF MANCHESTER has just issued a prospectus of University courses in the Municipal College of Technology, Manchester, for the session 1929-30. The work of the College includes advanced study and research in various branches of Science and Technology, and University Courses in the Faculty of Technology extending over three years and leading to Degrees and Certificates in Applied Chemistry covering (*a*) General Chemical Technology; (*b*) Chemistry of Textiles (Bleaching, Dyeing, Printing and Finishing); (*c*) Paper Manufacture; (*d*) Metallurgy and Assaying; (*e*) Chemical Technology of Brewing; (*f*) Electro-Chemistry; (*g*) Photography; (*h*) Colouring Matters (Higher Course); (*i*) Foodstuffs (Higher Course) and (*j*) Fuels (Higher Course).

THE STAFFORDSHIRE County Council are inviting applications for the post of head assistant chemist for the new County Laboratory at Stafford (see page xxviii).

SIR MAX MUSPRATT, after his recent serious illness, was warmly welcomed in Liverpool last week when he was able again to preside over the meeting of the Corporation Finance Committee.

MR. T. WILLIAMSON has been appointed on the propaganda staff of the Chilean Nitrate Committee, and will take charge of the six Northern Counties of England (including the Isle of Man).

MR. D. A. PRITCHARD, formerly works manager of the Canadian Salt Co., Windsor, Ontario, and now general production manager of the heavy chemical division of Canadian Industries, Ltd., Toronto, who has been on a visit to this country, sailed for Canada last week.

ALLEN-LIVERSIDGE, LTD., announce the opening of their new showrooms on Tuesday, September 10, at 123, Victoria Street, London. Exhibits demonstrating the application of acetylene, oxygen and electricity to the metallurgical and lighting needs of the industry, will be on view.

MR. MAX WOOSNAM, Labour Manager of Brunner, Mond and Co., Ltd., is, we are glad to learn, on the road to complete recovery after his recent illness, and hopes to resume work next month. Among the many sportsmen in the company he is outstanding, and his return will be welcomed by his numerous friends in I.C.I.

AN INQUEST opened on August 31, at Leeds, on Abraham Jowett, an asbestos worker at T. W. Roberts, Ltd., of Armley, who died from pulmonary disease and extensive fibrosis of both lungs, was adjourned until September 24, to enable a microscopic examination to be made. At the post mortem examination, certain bodies were found which proved that asbestos dust had reached the lungs.

MR. H. J. MITCHELL, Chairman of the Executive Council of Imperial Chemical Industries, Ltd., has just returned from an interesting visit to France and Spain. In Spain he had an opportunity of meeting representatives of the Union Española de Explosivos, and in France he was able to visit the Survilliers Factory of I.C.I.'s French associates, the Cartoucherie Française.

THE MANCHESTER CHAMBER OF COMMERCE, in a report on the state of trade in its Monthly Record for August, 1929, states that the chemical industry was steady, despite the reduced consumption of dye and bleaching material, owing to the closing of the mills. Caustic soda sold freely both for home and foreign use, and caustic potash and chlorates were in better demand. Acetic acid and sulphide of sodium were also in good request.

TO MARK the 51st anniversary of the foundation of Brotherton and Co., Ltd., Lord Brotherton invited all his workpeople, staff and pensioners to visit the Newcastle Exhibition on Saturday, August 31. There were contingents from all Brotherton and Co.'s works and offices, and many old pensioners, the party numbering about 1,000. The proceedings were most successful. Lord Brotherton, who was enthusiastically received by the guests, much enjoyed meeting his employees, and expressed the hope of having some similar form of annual reunion each Commemoration Day.

MR. A. E. POLLARD, H.M. Trade Commissioner at Vancouver, is now in this country on an official visit. Mr. Pollard will be in attendance at the offices of the Overseas Trade Department during the period September 16 to September 27, when he will be prepared to interview representatives of firms interested in the export of British goods to Canada. He will subsequently visit a number of commercial centres in the provinces. Applications for interviews with Mr. Pollard in London should be made at once to the Comptroller-General, Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, quoting the reference 13812/1/29.

A DRAFT ORDER for the improvement of welfare arrangements for workers in tanneries has been prepared by the Home Office, in view of the dirty and wet processes carried on in the industry. The order provides that suitable protective clothing shall be available for certain specified processes of liming and tanning of raw hides and skins. Accommodation must be provided for clothing put off during working hours with adequate arrangements for drying, under the charge of a responsible person, and facilities for washing must also be available. Objections to the proposed order, which is the result of conferences between representatives of employers and workers to discuss precautions for the prevention of anthrax, must be sent to the Home Office within forty days.

Obituary

MR. A. G. HOPPER, of Larchfield, Barkston Ash, managing director of the Olympia Oil and Cake Co., Ltd., Selby, Yorkshire.

MR. THOMAS S. F. GIBSON, M.I.C.E., aged 59, chief civil engineer of the South Metropolitan Gas Co., at his home, Normandy Lodge, Blackheath, on Wednesday, August 28. Mr. Gibson, who joined the company in 1895, was appointed works superintendent in 1900 at the Old Kent Road depot, and on the outbreak of war, he was placed in charge of the large plants required for the manufacture of munitions. He had held the post of chief civil engineer since 1920.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

316,647. ALKALI CYANIDES, MANUFACTURE OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 2, 1928. Addition to 301,565 (see THE CHEMICAL AGE, Vol. XX, p. 30).

The process of the parent Specification for the manufacture of alkali cyanides by the action of ammonia and carbon monoxide upon alkali oxides, hydroxides, or salts at 400—800° C. is modified by replacing the carbon monoxide partially or wholly by an oxygen derivative of a hydrocarbon which derivative yields carbon monoxide or a gas mixture containing carbon monoxide on heating above 400° C. The reaction may be accelerated by the use of catalysts. In an example ammonia gas saturated at 40° C with methyl alcohol is passed through a vigorously stirred melt, heated to 600° C, containing 1 part of sodium cyanide and 3 parts of sodium carbonate.

316,648. COMPOUNDS CONTAINING ACTIVE OXYGEN, MANUFACTURE OF.—A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 2, 1928.

In the cathodic production of compounds containing active oxygen, such as hydrogen peroxide, perborates, and percarbonates, corrosion of the amalgamated cathode sometimes occurs. Such corrosion is minimised in this invention by supplementing the mercury on the cathodes intermittently or continuously during the electrolysis. Metallic mercury may be caused to trickle over the cathodes or small quantities of mercury salts may be added to the electrolyte entering the cathode chamber.

316,691. A STABLE DIAZO COMPOUND, MANUFACTURE OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 8, 1928.

The diazo compound of 5-nitro-2-aminotoluene when coupled with certain arylides of 2:3-oxynaphthoic acid yields dyes of valuable red shades of outstanding fastness to light. By this invention the diazo compound is obtained in a stable form by converting it into the diazoniumborofluoride, e.g., by precipitation with aqueous hydroborofluoric acid.

316,693. BETAÏNE THIOCYANATE, MANUFACTURE OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main. Germany. Application date, May 8, 1928.

Betaïne thiocyanate is obtained by combining betaïne (trimethylglycocol) with thiocyanic acid or by double decomposition between a betaïne salt and a suitable thiocyanate. The product has advantages over the known therapeutic agents containing thiocyanic acid due to the fact that the betaïne is completely decomposed in the organism.

316,703. AROMATIC HYDROXY ACIDS, SEPARATION, ISOLATION, AND PURIFICATION OF. The Graesser-Monsanto Chemical Works, Ltd., Ruabon, North Wales, and D. P. Hudson, Abbey Road, Llangollen, Denbigh, North Wales. Application date, May 12, 1928.

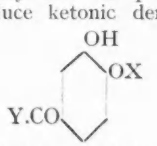
Isomeric or closely related aromatic hydroxy carboxylic acids are separated by utilising their differing acidities, either for selective acidification of the alkali metal salts or selective neutralisation of the free acids. Thus the acids may be fractionally extracted with a caustic alkali solution or a solution of the alkali metal salts may be fractionally treated with dilute mineral acid, the latter method being preferred. Alternatively a solution containing the mixed alkali salts of two or more hydroxy acids may be treated with a free hydroxy acid for the displacement of another or other weaker hydroxy acid or acids. The examples relate to the separation of salicylic acid from *p*-hydroxybenzoic acid and of 3-methyl-4-hydroxybenzoic acid from *o*-cresotinic acid.

316,735. DILUTE NITROUS GASES, ABSORPTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges. Frankfort-on-Main, Germany. Application date, June 13, 1928.

To facilitate the production of nitrites and nitrates by the alkaline absorption of nitrous oxides from gases containing them in dilute concentration, the gases are treated, prior to the absorption, with nitric acid under such conditions as regards the concentration of the acid and the temperature that oxidation of lower oxides to higher oxides of nitrogen occurs. The lower the concentration of the nitric acid, the higher is the temperature required to ensure efficient oxidation. The nitric acid is most effective in the form of vapour, and the gases may be caused to take up the requisite amount of the vapour by passing them through aqueous nitric acid of adequate concentration and temperature.

316,750. KETONES, MANUFACTURE OF. Boots' Pure Drug Co., Ltd., and J. Marshall, Station Road, Nottingham. Application date, July 6, 1928.

A monoalkyl ether of catechol or an ester thereof is caused to react with a fatty acid in presence of phosphorus oxy-chloride to produce ketonic derivatives of the type



in which X and Y are alkyl groups, the acidyl radicle taking up the *p*- position to the ether group. The examples relate to the production of 5-propionylguaiacol from propionic acid and guaiacol or guaiacol propionate and of 5-acetylguaiacol from acetic acid and guaiacol. The ketones and the monoalkyl ethers of alkylcatechols obtainable by reducing them, e.g., by the Clemmensen process, using zinc amalgam and hydrochloric acid, have therapeutic value.

316,761. A CONDENSATION PRODUCT OF α-NAPHTHYLAMINE AND ACETALDEHYDE AND THE APPLICATION THEREOF IN THE MANUFACTURE OF VULCANISED RUBBER, MANUFACTURE OF. The Clayton Aniline Co., Ltd., 505, Ashton New Road, Clayton, Manchester, and R. Robinson, Mosley Villa, Mitford Road, Withington, Manchester. Application date July 20, 1928.

In Specification 280,661 (see THE CHEMICAL AGE, Vol. XVII, p. 577) it is stated that the condensation product from acetaldehyde and α-naphthylamine not only has no substantial accelerating influence on the vulcanisation of rubber, but also has no great effect on the decrease of tensile strength of rubber vulcanised with its use when heated in a current of dry air. It is now found, however, that the product from 2 molecular proportions of acetaldehyde and 1 molecular proportion of α-naphthylamine has valuable anti-ageing properties when used in the vulcanisation of rubber. The condensation is preferably effected in an indifferent solvent, e.g., methylated spirit.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: —286,227 (I.G. Farbenindustrie Akt.-Ges.) relating to substantive trisazo dyestuffs, see Vol. XVIII, p. 418; 294,583 (Soc. of Chemical Industry in Basle) relating to azo dyestuffs, see Vol. XIX, p. 323; 298,907 (Imray) relating to azo dyestuffs, see Vol. XIX, p. 590; 302,175 (I.G. Farbenindustrie Akt.-Ges) relating to hydroxythionaphthenes and vat dyestuffs therefrom, see Vol. XX, p. 159.

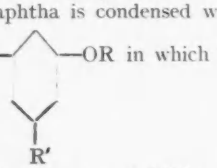
International Specifications Not Yet Accepted

314,803. DYES. Newport Co., Carrollville, Wisconsin, U.S.A. International Convention date, July 2, 1928. Addition to 297,692 (see THE CHEMICAL AGE, Vol. XIX, p. 418).

Blue dyes for cotton are obtained by treating halogenated

indanthrones at an elevated temperature with aromatic amines in presence of sodium acetate and copper or a copper salt. The products, being more or less completely dehalogenated, are free from objectionable impurities in the parent materials.

314,810. Synthetic Resins. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 2, 1928.

Crude naphtha is condensed with alkylaryl ethers of the type  in which R and R′ are the same or different alkyl groups and R″ is an alkyl group or hydrogen, the condensation being effected by means of a polymerising agent other than aluminium chloride. Specified catalysts are tin tetrachloride, borofluoracetic acid, and sulphuric acid. The products are adapted for use in the preparation of lacquers containing cellulose ethers, or plastic masses with the aid of softeners.

314,812. Regenerating Alkali Lyes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 2, 1928.

Waste alkali liquors such as are obtained in the manufacture of artificial silk are treated with a manganate or permanganate of an alkali metal to oxidise the cellulose and other organic impurities to carbon dioxide which combines with the alkali. The manganese separates as manganese dioxide which is filtered off and fused with caustic alkali or alkali carbonate in presence of air to form a manganate for further use.

314,858. Catalytic Sulphuric Acid Manufacture. Selden Co., Pittsburg, U.S.A. International Convention date, July 3, 1928.

Catalytic agents for the oxidation of sulphur dioxide comprise at least one leached permutogenetic body, diluted or undiluted, in which at least one catalytically active component is chemically combined in exchangeable or non-exchangeable form, with or without stabilisers or stabiliser promoters chemically combined or physically associated with the base exchange body. The permutogenetic bodies may be siliceous or non-siliceous, and the preferred catalytic element is vanadium.

314,859. Destructive Hydrogenation. Bataafsche Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. International Convention date, July 3, 1928.

The catalytic activity of the material known as "Luxmasse," obtained as a by-product in the purification of bauxite and consisting mainly of alkaline ferric oxide, is increased by subjecting it to mechanical, physical, or chemical treatment, or to a combination of such treatments. Specified treatments are (1) repeated extraction with hot water and drying, (2) dissolving in nitric acid, precipitating with ammonia, washing, and drying. The catalytic activity of the material is also increased by its use in hydrogenation.

314,870. Hydrogen, Catalytic Processes. Vereinigte Stahlwerke Akt.-Ges., 67, Breitestrasse, Dusseldorf, Germany. International Convention date, July 3, 1928.

Gas mixtures rich in hydrogen are produced by passing distillation gases, hydrocarbons, or gaseous mixtures containing hydrocarbons, together with superheated steam, over catalysts at temperatures not below 1,000° C. Specified catalysts are iron, cobalt, nickel, chromium, aluminium, manganese, silicon, carbon, copper, vanadium, tungsten, and the compounds or mixed crystals of these elements. The resulting gas mixtures are particularly suitable for reducing oxide ores of iron and other metals, and for the production of pure hydrogen, or of mixtures containing nitrogen, hydrogen, and carbon monoxide for the ammonia and methanol synthesis.

314,872. Amines. Compagnie de Produits Chimiques et Electrométallurgiques Alais, Froges, et Camargue, 23 Rue Balzac, Paris. International Convention date, July 3, 1928.

Cyclohexylamines are obtained by heating cyclohexanol or its homologues with primary amines in presence of a nickel hydrogenation catalyst.

314,894 Synthesising Ammonia. E. Urbain, 6, Rue Lyautey, Paris. International Convention date, July 4, 1928. Addition to 311,376. (See The Chemical Age, Vol. XXI, p. 34).

The reaction of ferrophosphorus with a mixture of nitrogen and steam is effected in presence of carbon or carbon compounds such as organic carbides or cyanogen compounds. The formation of iron carbide is stated to facilitate the reaction.

314,899. Dyes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 4, 1928. Addition to 311,283. (See The Chemical Age, Vol. XXI, p. 58.)

The aminoanthraquinones or their derivatives employed according to the parent Specification are replaced by halogenated aromatic amines such as chloranilines, 2:5-dichloraniline, 3:5-dibromaniline, 3:4:5-trichloraniline, and 1-amino-4:8-dichlornaphthalene. The products are vat dyes.

314,903. Dyes. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, July 4, 1928. Addition to 262,774 (See The Chemical Age, Vol. XVI, p. 189) and 294,485.

Halogenated dibenzanthrones giving blue dyeings fast to water on cotton are obtained by treating 2-2¹-dibenzanthronyl with more than 5 times its weight of ferric chloride.

314,944. Catalysts. Bataafsche Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. International Convention date, July 5, 1928.

Finely divided catalytic nickel, for use in preparing hydrogen and carbon dioxide from mixtures of methane or other hydrocarbons and steam, is prepared from a solution of a nickel salt, e.g., the nitrate, by adding a reagent such as caustic soda in quantity insufficient to precipitate the whole of the nickel as hydroxide, separating the hydroxide by filtration, washing and drying it, and reducing it with hydrogen at 350° C.

314,956. Ferricyanides. J. Schröter, B95, Steinkühlerweg, Hörde, Germany. International Convention date, July 5, 1928.

Ferrocyanides are converted into ferricyanides by heating them under pressure, e.g., at 100–150° C. under 50 atmospheres, with oxygen or a gas containing it in presence of water, and weak acid, such as carbonic acid, or sufficient acid to take up the base liberated by the oxidation, and completing the oxidation of the solution by electrolysis.

314,972. Ammonium Sulphate; Sulphur. C. J. Hansen, 33, Trappenbergstrasse, Essen, Germany. (Assignee of H. Koppers Akt.-Ges., Essen, Germany.) International Convention date, July 6, 1928. Addition to 309,565. (See The Chemical Age, Vol. XX, p. 594.)

Ammonium thiocyanate is decomposed with production of ammonium sulphate and sulphur by heating it with sulphuric acid in presence of a thiosulphate. The reaction may be carried out by heating to 200° C. in an autoclave lined with acid proof stone or with chromium-nickel steel.

314,976–7. Phosphoric Acid; Calcium Sulphate. Aktiebolaget Kemiska Patenter, Landskrona, Sweden. International Convention date, July 7, 1928.

The reaction between sulphuric acid and rock phosphate or other calcium phosphate for the production of phosphoric acid and calcium sulphate is effected (1) (according to Specification 314,976) in such a way that the calcium sulphate is deposited in an easily separable form either as $CaSO_4.\frac{1}{2}H_2O$, or as anhydrite; a reaction mixture containing 0·10 mols. H_2SO to 1 mol. H_2O is suitable, and the temperature may be raised to 137° C; (2) (according to Specification 314,977) in a closed vessel whereby foaming is prevented and a higher temperature used resulting in the formation of the easily separable $CaSO_4.\frac{1}{2}H_2O$ or anhydrite.

314,987. White Lead. R. J. Frost, Clayton, Victoria, Australia. International Convention date, July 6, 1928.

White lead is produced by subjecting lead electrodes to the action of direct current flowing in alternate directions for a predetermined period, e.g., 15 mins. in each direction, in a dilute aqueous solution of commercial sodium bicarbonate.

314,999. Carrying out Chemical Reactions in Closed Vessels. Hirsch Kupfer-und-Messingerwerke Akt.-Ges., Messingwerk, Eberswald, Germany. International Convention date, July 6, 1928.

Solids, liquids, or gases undergoing reaction in a closed vessel are agitated by particles of electrically conducting material placed in the vessel and caused to move by eddy currents generated in them by an alternating current passed through an induction coil surrounding the vessel.

Latest Notifications.

317,843. Process for substantially suppressing phosgene-formation when extinguishing fires with carbon tetrachloride. I.G. Farbenindustrie Akt.-Ges. August 25, 1928.

317,763. Pigments and coloured surfaces. Soc. of Chemical Industry in Basle. August 21, 1928.

317,854. Manufacture of highly esterified acetyl-nitro-cellulose Naamlooze Vennootschap Fabriek Van Chemische Producten. August 24, 1928.

317,857. Process and apparatus for obtaining light hydrocarbons (benzenes and petrols) during the low-temperature carbonisation of solid fuels. Meiro, A. August 24, 1928.

Specifications Accepted with Date of Application

290,636. Dyestuffs of the anthraquinone series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. May 18, 1927. Addition to 276,408.

292,164. Improving the character of grey iron castings by graphitisation, Method for. Mechanite Metal Corporation. June 16, 1927.

292,168. Condensation products, Manufacture of. Soc. of Chemical Industry in Basle. June 16, 1927.

292,622. Dyestuff preparations, Manufacture of. Soc. of Chemical Industry in Basle. June 24, 1927.

293,763. Alkylene oxides from alkylene chlorhydrins, Continuous production of. T. Goldschmidt Akt.-Ges. July 11, 1927.

300,629. Potassium carbonate, Production of. Kali-Industrie Akt.-Ges., C. T. Thorssell, and A. Kristensson. November 18, 1927.

302,171. 4-Chloro-1-aminoanthraquinone-2-sulphonic acid, Manufacture of. I.G. Farbenindustrie Akt.-Ges. December 8, 1927.

309,942. Processes for carrying out endothermic chemical reactions. Krupp Grusonwerk Akt.-Ges. April 18, 1928.

317,110. Plating with chromium. R. Grah. June 22, 1928.

317,303. Diolefines, Manufacture and production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) February 13, 1928.

317,304. Nitro compounds of dinaphthylene dioxide and derivatives thereof, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 9, 1928.

317,338. Azo dyestuffs forming metallic salts, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) April 13, 1928.

317,342. Alkoxy aliphatic anhydrides, Manufacture of. H. Dreyfus. April 14, 1928.

317,344. Liquid polymerisation products from gases containing hydrocarbons, Processes for the production of. C. Epner. May 9, 1928.

317,347. 3-Alkoxy-4-hydroxybenzaldehydes and derivatives thereof, Production of. Graesser-Monsanto Chemical Works, Ltd., and D. P. Hudson. May 12, 1928.

317,355. Aqueous diazonium salt solutions, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 14, 1928.

317,359. Diolefines, Manufacture and production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) February 13, 1928.

317,381. Aromatic oxyaldehydes, Production of. Graesser-Monsanto Chemical Works, Ltd., and D. P. Hudson. April 14, 1928.

317,419. Azo dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 15, 1928.

317,428. Dyes and dyeing. R. S. Barnes, J. E. G. Harris, J. Thomas, and Scottish Dyes, Ltd. May 16, 1928.

317,431. Azo dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 16, 1928.

317,500. Unsaturated hydrocarbons, Manufacture and production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) April 14, 1928.

317,506. Recovery of organic substances which are volatilisable at an elevated temperature, and apparatus therefor. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) April 30, 1928.

317,507. Heat-treating hydrocarbon oils. R. C. Osterstrom and C. R. Wagner. May 9, 1928.

317,508. Treating hydrocarbon compounds, Method of and apparatus for. A. Balmer. (*Petroleum Conversion Corporation.*) May 11, 1928.

317,530. Azo dyestuffs, Manufacture of. K. and K. S. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 19, 1928. Addition to 294,291.

317,555. Anthraquinone derivatives, Manufacture of. Imperial Chemical Industries, Ltd., A. J. Hailwood, W. W. Tatum, and G. E. Watts. May 26, 1928.

317,558. Effecting chemical reactions in gases by means of electrical discharges. P. H. Hull and Imperial Chemical Industries Ltd. May 31, 1928.

317,572. Bleaching-powder, Manufacture of. J. W. Moore, A. Lamble, and Imperial Chemical Industries, Ltd. June 9, 1928.

Applications for Patents

Birchall, T., Coffey, S., and Imperial Chemical Industries, Ltd. Manufacture of alkylidene ethers. 26,431. August 30.

Brempell, V. I., Britzke, E. V., and Jakubowitz, M. E. Production of sodium fluorite. 26,348. August 29.

Brightman, R., and Imperial Chemical Industries, Ltd. Application of azo-dyestuffs. 25,965. August 26.

Brotherhood, Ltd., P., and Dunkerley, H. M. Manufacture of solid carbon dioxide, etc. 26,177, 26,178. August 28.

—— Mould for manufacture of solid carbon dioxide, etc. 26,185. August 28.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of condensation products. 26,212. August 28.

—— Manufacture of naphthaline-2:6-dicarboxylic acid. 26,478. August 30.

—— Manufacture of azine derivatives. 26,479. August 30.

—— Manufacture of shuttles. 26,480. August 30.

—— Manufacture of carbazole derivatives. 26,481. August 30.

—— Manufacture of rubber-like masses, etc. 26,482. August 30.

—— Manufacture of esters of phosphorus and phosphoric acid containing halogen. 26,541. August 31.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of azo-dyestuffs insoluble in water. 26,041, 26,042. August 27.

—— Manufacture of aminodiphenylamine compounds. 26,043. August 27.

Hawkyard, A. Electrolysis of alkali chlorides, etc. 26,282. August 29.

Hooley, L. J., Scottish Dyes, Ltd., and Thomas, J. Dyes. 26,465. August 30.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of lacquers, etc. 26,332, 26,333, 26,334. August 29. (March 14).

—— Apparatus for recovery of energy transmitted to liquids in conveyance of same. 26,449. August 30.

—— Manufacture of polymerisation products of diolefines. 26,450. August 30.

I.G. Farbenindustrie Akt.-Ges. Method of manufacturing shaped sections of uniform thickness. 25,972. August 27. (Germany, October 3, 1928.)

—— Uniting surfaces of wood or paper. 26,179. August 28. (Germany, September 14, 1928.)

—— Manufacture of dyestuff pastes, etc., 26,180. August 28. (Germany, August 29, 1928.)

—— Manufacture of printing-pastes, etc. 26,317. August 29. (Germany, August 29, 1928.)

—— Manufacture of optically-active 1-phenyl-2-methyl-aralkylaminopropanols-1 and 1-phenyl-2-methylaminopropanol. 26,319. August 29. (Germany, September 3, 1928.)

—— Manufacture or organic arsenic and antimony compounds. 26,444. August 30. (Germany, September 3, 1928.)

—— Manufacture of azo-dyestuffs. 26,445. August 30. (Germany, October 4, 1928.)

—— Casting magnesium, etc. 26,462. August 30. (Germany, September 19, 1928.)

Imperial Chemical Industries, Ltd. Treatment of fibres, etc. 26,194. August 28.

—— Crushing and grinding solids. 26,263. August 29.

—— Resinous compositions. 26,411. August 30.

—— Extracting potash from silicates. 26,434. August 30.

—— Coking Coal. 26,435. August 30.

Kahl, L., and Rütgerswerk Akt.-Ges. Production of anthracene. 26,424. August 30. (Germany, September 29, 1928.)

Obermeyer, O. Dyeing machines. 25,966. August 26.

Soc. of Chemical Industry in Basle. Manufacture of cellulose derivatives. 26,318. August 29. (Switzerland, August 31, 1928.)

Stalhane, O. Apparatus for production of cyanogen compounds. 26,227, 26,228. August 28. (Sweden, September 5, 1928.)

Motion Pictures of Metallurgical Operations

"Making it Tough" is the title of an educational motion picture film just released by the United States Bureau of Mines, which visualises strikingly the manufacture and uses of alloy steels, which because of their extreme hardness, strength and durability play an important part in the making of numerous articles in every-day use. The film, which comprises three reels, was prepared in co-operation with one of the large alloy steel manufacturing concerns in the United States. Copies of the film are available for showing by schools, churches, clubs, commercial organisations, miners' unions, civic bodies and others interested. No charge is made for the film, but the exhibitor is asked to pay the costs of transportation.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6¾d. to 8d. per lb. Crude 60's, 2s. 2d. to 2s. 5d. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 4s. 6d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 2s. 3d. per gall. Dark, 1s. 6d. to 1s. 10d. Refined, 2s. 8d. to 3s. per gall.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 2s. per gall. Firm. Pure, 2s. 1d. to 2s. 3d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, 6¼d to 6¾d. per gall. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 2d. to 2¼d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8d½. to 8¾d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, 1s. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 45s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy, prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—£2 17s. 2d. per cwt., in ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots d/d.

p-CRESOL 32/34° C.—1s. 11d. per lb., in ton lots d/d.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C, 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5¼d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅞d. to 5¼d. per lb.

LAMP BLACK.—£30 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London

SULPHUR.—£10 to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 6d. to 6s. 9d. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 0½d. to 2s. 1d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—10½d. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 5d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE —5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—8s. 9d. per lb.
BISMUTH CITRATE.—8s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 3d. per lb.
BISMUTH SUBNITRATE.—7s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.
BISMUTH OXIDE.—11s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 3d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 1s. 11½d. per lb.; potassium, 1s. 8½d. per lb.; granular, 1s. 7¾d. per lb.; sodium, 1s. 10½d. per lb. Prices for 1 cwt. lots.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3½d per lb., in 1-cwt. lots.
CAMPHOR —Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb. U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 21s. per lb. net; Synthetic, 12s. to 14s. per lb.; Synthetic detached crystals 12s. to 16s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 6d. to 1s. 8d. per lb.
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 2½d. per lb.
PHENAZONE.—5s. 11d. to 6s. 1½d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—102s. to 104s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 7d. per lb. in 1 cwt. lots.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—43s. 6d. per lb.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 4d. per lb., B.P.C. 1923—2s. 7d. per lb. Prices for 1 cwt. lots. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. to 105s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 5d. per lb. Crystal, 2s. 3d. to 2s. 6d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—12s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL CINNAMIC ALDEHYDE.—17s. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—6s. 6d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—14s. per lb.
COUMARIN.—8s. 9d. per lb.
CITRONELLOL.—9s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—12s. per lb.
GERANIOL (PALMAROSA).—21s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. 6d. per lb.
ISO EUGENOL.—14s. 3d. per lb.
LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 10s. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 16s. per lb. Ex Shui Oil, 12s. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—56s. per lb.
SAFROL.—2s. 6d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—14s. 4d. to 17s. 6d. per lb. Ex Guaiacol, 14s. 6d. to 15s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—3s. 9d. per lb.
BERGAMOT OIL.—15s. 9d. per lb.
BOURBON GERANIUM OIL.—22s. per lb.
CANANGA OIL, JAVA.—11s. 6d. per lb.
CASSIA OIL, 80/85%.—6s. per lb.
CINNAMON OIL LEAF.—7s. 9d. per oz.
CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 4d. per lb.
CLOVE OIL (90/92%).—9s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 16s. per lb.
LEMON OIL.—16s. 6d. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—18s. 3d. per lb.
OTTO OF ROSE OIL.—Anatolian, 70s. per oz. Bulgarian, 110s. per oz.
PALMA ROSA OIL.—12s. 3d. per lb.
PEPPERMINT OIL.—Wayne County, 16s. 6d. per lb.; Japanese, 7s. per lb.
PETITGRAIN.—8s. 9d. per lb.
SANDALWOOD.—Mysore, 32s. per lb.: 90/95%, 19s. per lb

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, September 5, 1929.

THERE is no change to report in the volume of business coming to hand during the past week, and prices are firm and unchanged.

General Chemicals

ACETONE.—Quite a steady demand is coming to hand, with the market continuing firm at £75 to £85 per ton.

ACETIC ACID is in brisk demand, and supplies are now available in larger quantities. Prices continue firm at £36 10s. per ton, 80% technical quality.

ACID CITRIC.—A brisk demand is on the market with the price firm at 2s. 2d. to 2s. 3d. per lb.

ACID FORMIC is in steady request, and the price, at £41 to £42 per ton for 85%, is in buyer's favour.

ACID LACTIC.—A satisfactory business is passing, with prices firm at £43 per ton for 50% by weight standard, pale quality.

ACID TARTARIC.—Demand is active and the market continues firm at 1s. 5d. per lb., less 5%.

ALUMINA SULPHATE is in rather good demand at the unchanged firm rates of £7 15s. to £8 per ton.

ARSENIC is slow of sale, with the price unchanged at £16 5s. per ton free on rails at mines, at which figure it is in buyer's favour.

BARIUM CHLORIDE continues in active demand, with supplies coming to hand more freely. These, however, are eagerly sought after, and there is very little quantity free for early delivery. The market continues at £12 to £12 10s. per ton.

CREAM OF TARTAR.—Steady conditions continue, and the price is unchanged at £100 to £105 per ton for 98/100% B.P. quality.

COPPER SULPHATE is in rather better request, and the product is now firmer at £26 10s. to £27 per ton.

FORMALDEHYDE.—A satisfactory demand is being received, and the price favours buyers at about £38 per ton.

LEAD ACETATE continues firm at £43 10s. for white and £42 10s. for brown, with demand improving.

LEAD NITRATE.—Steady at £33 15s.

LIME ACETATE.—Unchanged at £18 per ton, with improved demand.

LITHOPONE.—There is a steady business passing at £19 15s. to £23 per ton, according to quality and quantity.

METHYL ACETONE.—Steady at £58 to £60 per ton, with demand fair.

POTASSIUM CHLORATE.—Active and firm at £28 to £30 per ton.

POTASSIUM PERMANGANATE.—In good request at 5¼d. to 5¾d. per lb.

POTASSIUM PRUSSIATE.—The market is unchanged at £63 10s. to £65 10s. per ton, according to quantity, and there is a fair demand.

SODIUM ACETATE CRYSTALS.—The market continues firm at £22 10s. to £23 per ton, with standard first-class crystals still in rather short supply.

SODIUM BICHROMATE.—Steady and in fair request at 3⅝d. per lb. with discount for a large quantity.

SODIUM HYPOSULPHITE PHOTOGRAPHIC CRYSTALS.—Demand has been brisk, with prices unchanged at £14 10s. to £15 per ton.

SODIUM NITRITE.—Firm, with the product in better request at £20 per ton.

SODIUM PHOSPHATE.—Rather more business is passing in dibasic at £12 per ton, and there is no change in the price of tribasic at £16 10s.

SODA PRUSSIATE.—Continues in good request at 4½d. to 5½d. per lb., according to quantity.

TARTAR EMETIC.—Slightly firmer at 11¼d. per lb., with a fair demand.

ZINC SUPLHATE.—In good request at £12 per ton.

Coal Tar Products

The market for coal tar products remains very quiet, and prices are unchanged from last week.

MOTOR BENZOL is unchanged, at about 1s. 5½d. to 1s. 6d. per gallon, f.o.r. makers' works.

SOLVENT NAPHTHA is quoted at about 1s. 2½d. to 1s. 3d. per gallon f.o.r.

HEAVY NAPHTHA remains at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL is unchanged at 3½d. to 4d. per gallon on rails in the North, and at 4¾d. per gallon in London.

NAPHTHALENES remain firm, at about £4 10s. per ton for the fire lighter quality, at £5 per ton for the 74/76 quality, and at £6 to £6 5s. for per ton for the 76/78 quality.

PITCH is being quoted at up to 45s. per ton, f.o.b. East Coast port but little business has been done.

Nitrogen Products

Sulphate of Ammonia.—The demand from abroad still continues to be somewhat quiet, but this is only to be expected at this time of the year. The price remains unchanged at £8 15s. 9d. per ton, f.o.b. U.K. port, in single bags for neutral quality, basis 20·6 per cent. nitrogen.

Home.—The home market for this product is extremely dull and uninteresting. A few makers are busy delivering mixer requirements, but apart from this there is very little business being done.

Nitrate of Soda.—There is still no change to report.

Latest Oil Prices

LONDON, September 4.—LINSEED OIL was in fair request at about 15s. per ton decline. Spot, ex mill, was exceptionally unchanged at £39; September, £37; September-December, £36 17s. 6d.; January-April, £37, naked. RAPE OIL was firm. Crude extracted, £43; technical refined, £44 10s., naked, ex wharf. COTTON OIL was steady. Egyptian crude, £33 10s.; refined common edible, £38; and deodorised, £40, naked, ex mill. TURPENTINE was quiet. American, spot and December, 43s.; January-April, 44s. 9d. per cwt.

HULL.—LINSEED OIL.—Spot to September-December, £38; January-April, £37 10s. per ton, naked. COTTON OIL.—Egyptian crude, spot, £33 5s.; November-December (new), £30 5s.; edible refined, spot, £35 15s.; technical, spot, £35 15s.; deodorised, spot, £37 15s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £34 per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot, £37 10s.; deodorised, spot, £41 10s. per ton. SOYA OIL.—Extracted, spot, and crushed, spot, £34 10s.; deodorised, spot, £38 per ton. RAPE OIL.—Crushed/extracted, spot, £42; refined, spot, £44 per ton. TURPENTINE and CASTOR OIL unaltered. COD OIL.—Spot, 30s. 6d. per cwt., net cash terms, ex mill.

South Wales By-Products

PITCH remains the most interesting feature of South Wales by-product activities. Although there are heavy stocks, makers, confident apparently of heavy autumn export demands, are maintaining prices on the basis of 47s. to 49s. per ton, f.o.b. and 50s. delivered. Welsh patent fuel exports are increasing, and, although manufacturers are holding off, it appears that they must eventually step into the higher market. Road tar is slightly better with quotations unchanged at from 10s. 6d. to 13s. 6d. per 40-gallon barrel. Crude tar has only a weak call and quotations are on a basis of from 26s. to 30s. per ton. Creosote is quiet round about 3¼d. to 4¼d. per gallon. Naphthas are in good demand, solvent being quoted at from 1s. 3½d. to 1s. 6d. per gallon, and heavy naphtha at from 11d. to 1s. 1d. per gallon. Motor benzol is stronger at from 1s. 5d. to 1s. 7d. per gallon. Refined tars continue to have a good call, with values unchanged. Patent fuel quotations are :—Ex-ship, Cardiff, 21s. 6d.; ex-ship, Swansea, 20s.; and ex-ship, Newport, 20s. 6d. per ton. Coke quotations are :—Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 26s. 6d. to 32s., and furnace from 21s. to 22s. per ton. Oil imports over the last four ascertainable weeks totalled 21,568,786 gallons.

The Australian Fertiliser Merger

A FURTHER DEVELOPMENT is announced in connection with the merging of the interests of the principal fertiliser manufacturing companies in the Commonwealth of Australia. Negotiations have now been concluded, whereby the Electrolytic Zinc Co. of Australasia Ltd., acquires a one-fourth interest in Australian Fertilisers Proprietary, Ltd. The Electrolytic Zinc Co., in addition to its works at Port Kembla, N.S.W., has a substantial interest in A.C.F. and Shirley's Fertilisers, Ltd., Queensland. The remaining shares in Australian Fertilisers Proprietary, Ltd., are held equally by Mount Lyel Mining and Railway Co., Ltd., Cuming, Smith and Co. Proprietary, Ltd., and Imperial Chemical Industries of Australia and New Zealand Ltd.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, September 4, 1929.

THE activity in heavy chemicals and solvents remarked upon in our last report is still maintained, and the proportion of orders in relation to inquiries has been good during the past week. Prices remain practically unchanged with the exception of acetic acid, which is somewhat at a premium for prompt delivery and consequently demanding rather more than the figures named recently. Prices mentioned in our list are those actually quoted by the combine, but prompt delivery is rather difficult to obtain.

Industrial Chemicals

ACETONE.—B.G.S. £76 10s. to £85 per ton ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton ex wharf; 80% technical, £37 10s. per ton ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC ICE CRYSTALS.—Prompt delivery difficult to obtain, and prices now quoted for early delivery round about 8d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC B.P. CRYSTALS.—Quoted 2s. 2d. per lb., less 5% ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at about 3¼d. per lb., ex store. Offered from the Continent at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality, £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 5d. per lb., less 5% ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5 % ex wharf

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material quoted £35 per ton, ex wharf. On offer for prompt shipment from China at £33 10s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Now quoted £18 per ton, ex wharf, prompt despatch from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price advanced to about £11 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Remains steady at about £36 10s. per ton, ex store.

GLAUBER SALTS.—English material, quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 10s. per ton. Brown on offer at about £39 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅜d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE, 96/98%.—Spot material on offer £26 10s. per ton, ex store. Offered from the Continent at £25 5s per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. Crystals.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums; £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums, and 70/75%, £14 2s. 6d. per ton in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅝d. per lb., delivered buyers' premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £9 9s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Spot material on offer at 5½d. per lb., ex store. Quoted 5⅜d. per lb., ex wharf to go forward.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption:—Solid 60/62%, £9 per ton; broken, 60/63%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material now quoted at £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—Please note that the above prices are for bulk business and are not to be taken as applicable to small quantities.

High-Speed Building at Olympia

ALL records for speed in British steel construction have been broken at Olympia, London, where two storeys of a new four-storey exhibition building have to be ready in time for the British Industries Fair next February. Demolition of houses on the site began less than five months ago; the second floor of the new building, which is to be the largest in the Empire, will be roofed in by the end of September.

The architect, Mr. Joseph Emberton, states that 5,000 tons of steel have been erected in ten weeks. During one week 800 tons were delivered and erected, as compared with the normal rate in London of 100 tons. Eighty-four engineers have been employed in the calculation and design of the steel structure. Ninety erectors and 300 other workmen have also been employed continuously. Two 20 ton cranes, the largest ever used except for bridge works, were brought from the Tyne Bridge to lift the 22-ton girders into place. Some of the columns carry 1,500 tons, the spans—probably the largest in the country—being over 50 ft. The Fair is to be held from February 17 to 28.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, September 5, 1929.

Oldham holidays, which are in progress this week, officially wind up the industrial holiday season in the Lancashire district, and traders are hopeful that the demand for chemical products will broaden out. During the past week, business has been on no more than moderate proportions so far as new orders are concerned, although delivery specifications against existing contracts are not unsatisfactory, and quotations are pretty steady all round.

Heavy Chemicals

A moderate trade has been reported this week in phosphate of soda, quotations for which are up to £11 10s. per ton. Prussiate of soda continues very firm at from 4¾d. to 5¼d. per lb., according to quantity, and a quietly steady business in this section is being put through. Inquiry in the case of chlorate of soda is on somewhat quiet lines and current offers are down to about 2½d. per lb. Bichromate of soda remains very steady on the basis of 3⅝d. per lb., and a fair amount of buying interest in this material is being shown. There is not much doing in the case of sulphide of sodium, but values are well held at round £9 per ton for the 60–65 per cent. concentrated solid quality and from £7 12s. 6d. to £7 15s. for the commercial. Caustic soda is firm and a fair amount of business is being done, particularly against contracts; offers range from £13 5s. to £14 10s. per ton, according to quality, and for prompt lots, contract commitments being subject to a discount. Saltcake is moving in moderate quantities at about £2 12s. 6d. per ton. Alkali is firm and in fair request at about £6 per ton in contracts, with bicarbonate of soda in a somewhat similar position at £10 10s. per ton. Hyposulphite of soda is reasonably steady, although there is only a relatively quiet trade reported in this section; the photographic grade is quoted here this week at from £15 to £15 10s. per ton and the commercial material at round £9.

As before, yellow prussiate of potash keeps very firm at from 6¾d. to 7¼d. per lb., according to quantity, and a quietly steady trade is going through. Chlorate of potash is, if anything, easy in tendency at about 2⅞d. per lb., and the demand at the moment is on quiet lines. Business in the case of caustic potash is only moderately good, but there has been no change in the price situation since a week ago, offers ranging from £32 per ton upwards, according to quantity. Carbonate of potash is maintained at about £25 5s. per ton, ex store, for the 96–98 per cent. grade, with a moderate inquiry reported. There is only a comparatively slow movement of permanganate of potash, with the commercial quality quoted at 5⅛d. per lb., and the B.P. at 5½d. Bichromate of potash keeps very steady at round 4¼d. per lb., and a fair volume of business is being put through.

A moderate inquiry is being met with in the case of sulphate of copper offers of which are maintained at £26 10s. per ton, f.o.b. Arsenic continues to meet with a quiet sale with quotations ranging from about £16 to £16 5s. per ton at the mines for white powdered, Cornish makes. The demand for acetate of lime is not very pressing, but values keep up at from £16 5s. to £16 10s. per ton for the grey kind, and round £8 for the brown. Acetate of lead keeps fairly steady at the moment at £39 per ton for brown and £40 for white, although the buying movement is rather slow. Nitrate of lead is dull, but offers are maintained at round £34 per ton.

Acids and Tar Products

There has been a fair inquiry about for acetic acid this week at firm prices, the 80 per cent. commercial quality being quoted at £36 per ton and the glacial at £66. Oxalic acid is only in quiet request, but quotations keep up at about £1 13s. per cwt., ex store. Citric acid is reasonably steady at 2s. 1d. per lb., although only a moderate trade has been done. Tartaric acid is well held at round 1s. 4¾d. per lb., and demand in this section is on a quietly steady scale.

Among the by-products, pitch continues to be quoted at the fixed price of £2 5s. per ton, f.o.b., and a moderate volume of export inquiry is in circulation. Creosote oil is fairly steady at about 3½d. per gallon, naked, at works, although so far as the demand is concerned there is room for improvement. Carbolic acid is being steadily called for, and values are firm at from 8¼d. per lb. for crystals and 2s. 5d. per gallon for crude 60's. A fair trade is being done in solvent naphtha, which continues to be quoted here at 1s. 2½d. per gallon.

Company News

Barry, Ostlere and Shepherd.—The directors announce an interim dividend on the ordinary shares of 5 per cent., less tax, payable on October 15.

Waxed Papers, Ltd.—The board announce that in view of the fact that the competition referred to in the directors' report for the year to December 31, 1928, still continues, they consider it inadvisable to declare the interim dividend on the preference shares until the year's results are ascertained.

North British Artifical Silk.—The report for the period from the formation of the company in March, 1928, to May 31, 1929, states that the erection and equipment of the factory have been completed and the whole of the expenditure has been charged to capital account. The factory was formally opened and production started on June 28, 1929. The balance sheet as at May 31, 1929, shows issued capital, less calls in arrear £6,362, at £378,637. (Since close of books calls in arrear £4,825 have been paid.) Sundry creditors figure at £10,285. On assets side, lands, building, plant, etc., at cost stand at £269,615, preliminary expenses at £35,881, commission on shares £26,343, stocks £1,791, debtors £45, and cash £55,247—total, £388,924.

Metafilters (1929).—The statutory report states that the total amount of cash received in respect of shares issued wholly for cash is £30,000, and sundry receipts were £488, making total receipts £30,488. Payments on capital account to August 27, 1929, are as follows: Preliminary expenses, £1,763; cash consideration payable to vendors and others under sale agreement dated June 11, 1929, £8,999; alteration and extension to works and plant and machinery, £1,419; office furniture, £160; motor car, £187; sundry payments, £2,766; 5½ per cent. Treasury Bonds, 1930, £12,131; cash at bank, £3,063; total, £30,488. Preliminary and formation expenses, including stamp duty on agreements, are estimated at £2,500. The annual meeting will be held at Winchester House, London, E.C., on September 11, at 12 noon.

Explosives Manufacture in Canada

The rapid development of the mining industry in Canada in recent years has led to the greater utilisation of explosives of various descriptions, and the industries engaged in the manufacture of these articles have also benefited by the expansion of tourist traffic resulting in the purchase of quantities of ammunition for use in game shooting. The Dominion Bureau of Statistics at Ottawa has just issued its report on the statistics of those industries engaged in 1928 in the manufacture of explosives, ammunition, fireworks and matches, the total production of which was valued at $13,521,720, as compared with $12,921,079 in 1927. This total included the output of 14 plants, of which 4 manufactured explosives, 3 made ammunition, 4 produced fireworks, and 3 manufactured matches. The explosives factories were located at Beloeil, P.Q.; Nobel, Ont.; Prescott, Ont.; and James Island, B.C. The ammunition plants were situated at Brownsburg, P.Q. (2); and Quebec, P.Q. Manufacturers of fireworks had works at Islington, Ont.; Dixie, Ont.; Hamilton, Ont.; and St. Pierre, P.Q. Match plants were located at Hull, P.Q.; Berthierville, P.Q.; and Pembroke, Ont. Capital employed in these plants totalled $19,361,448; employees numbered 2,008; salaries and wages amounted to $1,860,239; and materials cost $4,453,205. The value added by manufacturing was $9,068,515.

"Synthetic Gold"

From Wellington, New Zealand, comes the cheerful announcement that two research workers living at Christchurch, Mr. G. P. Aston and Mr. H. W. Atack, make the startling claim that by the use of an electric-magnetic process they have succeeded in transmuting certain elements into gold. This result has been achieved, it is stated, after 15 years of exacting and dangerous work in the laboratory. The results of their research are reported to be under the notice of the New Zealand Government and also of the British Government, as well they might be. A very important feature of their work is said to be the discovery by Mr. Aston of a new force, to which he has given the name "chromadyne," which is claimed to be ten times more powerful than electricity.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

WIDDISON, Henry Reuben, 1A, Kensington Avenue, Thornton Heath, paint and stain manufacturer. (C.C., 7/9/29.) £13 18s. 4d. August 1.

London Gazette, &c.

Company Winding Up Voluntarily

VICLEY AND CO., LTD. (C.W.U.V., 7/9/29.) At an extraordinary general meeting of the members of the above named company, duly convened, and held at Canal Side Dye Works, Bennett Street, Long Eaton, Derby, on August 19, 1929, the following extraordinary resolution was duly passed:—"That as the Vicley Co., Ltd., by reason of its liabilities, cannot continue its business, it is advisable to wind up the same, and that the company be and is hereby placed in voluntary liquidation and further that Mr. Frederick Stokes, of 22, Union Road, Nottingham, be and he is hereby appointed Liquidator for the purpose of such winding-up."

New Companies Registered

THE LOW MOOR COKE CO., LTD., 124, Victoria Street London, S.W.1. Registered as a public company on August 29. Nominal capital, £1,000 in £1 shares. Coke manufacturers; manufacturers of ammonia, tar and tar products, benzol, etc. A subscriber: A. W. Pears, 6, Colchester Avenue, Manor Park, London, E.12.

Titanium in Tasmania

Report of Director of Mines

IN his report for the year 1928 the Director of Mines in Tasmania (Mr. McIntosh Reid) states that inquiries have been received for ilmenite during the past two or three years from paint manufacturers and from company promoters. One mainland paint manufacturer has been supplied with crude ilmenite sand for experimental purposes. That firm was unable to effect a clean separation of the titanium from the zircon. Another firm in Sydney appears to have examined the problem of ilmenite reduction fairly thoroughly, but has not been able to launch out, because it would be necessary to buy the patent rights attaching to the process of reducing ilmenite to titanium white, to import a chemist having actual experience of the work, and to instal a large plant. After close investigation it was found that production on a commercial scale would be in excess of Australian requirements for paint. When this firm learned that a high-grade ilmenite could be obtained from Tasmania at much lower price than their supplies, the manager suggested the reduction of the ilmenite on the spot to a more marketable form. A smelting process was indicated, but no details were offered regarding the method of treatment nor of the required qualities of the product.

A Survey Needed

Mr. McIntosh Reid expresses the opinion that a survey of existing markets for titanium ores, the development of an Australian market, and the promotion of industries to those ends are matters of considerable importance to Australia. A more extended market may be obtained by preparing titanium oxide for special cements, which are now coming into more general use. The potential reserves in King Island and in Tasmania are stated by the Director to be of such magnitude that thorough investigations of the problems are warranted. Such problems are: (1) The elimination of the associated zircon; (2) the separation of tin-ore; (3) the reduction of the ilmenite compound on the spot in order to concentrate the titanium component and thereby greatly increase the value. (The Department is continuing research to this end); (4) the provision of a large market.

In regard to titanium cement, its manufacture has not yet been undertaken on a very large scale, except in America, where it is coming into more general use. It is claimed that titanium cement is more dense and chemically more resistant than any other cement. The process of manufacture is simple; when a mixture of ilmenite, lime, and coke are fused in an electric furnace or a blast furnace, the iron content is converted into pig iron, and the slag, when finely ground, becomes titanium cement.

New Ontario Copper Refinery

IT is understood that 250 men are now engaged on the excavation work in connection with the erection of the custom copper refining plant being built by the Ontario Refining Co. at Copper Cliff, Ontario, at an estimated cost of $5,000,000. The number of employees will be brought up to 600 when work begins on the erection of the steel structure, and it is anticipated that the entire plant will be in operation by January, 1931.

The new plant is being erected on a 40-acre site, there being three main buildings, namely an electrolytic cell house and two casting buildings, one for crude copper and the other for refined copper. The cell house will be roughly 300 by 400 feet, and will have 1,200 reinforced concrete cells with lead linings. The casting buildings will be 200 by 400 feet and will have three furnaces, each with a capacity of 450,000 pounds of copper. It is pointed out that to double the initial capacity of the refinery the cell house will have to be doubled in size, but the casting buildings are being built so that the increase can be gained with the addition of one furnace in each building. The buildings themselves will be brick and the construction over steel. Associated in the Ontario Refining Co. are the International Nickel Co. of Canada, the American Metal Co., the Consolidated Mining and Smelting Co., and Ventures, Ltd.

New Benn Publications

THE new publications announced by Ernest Benn, Ltd., include the following:—

A History of British and American Etching. By James Laver. (£3 3s.) Mr. Laver, of the Victoria and Albert Museum, introduces a very fine series of collograph illustrations tracing the evolution of etching from its beginnings in England to the present day in both countries.

The Typography of Newspaper Advertisements. By Francis Meynell. (£2 2s.) Mr. Meynell's book gives the advertiser, the typographer, and the working printer an invaluable display of all modern type faces, a table for calculating the number of words of any type which can be fitted into a given space, and a gallery of newspaper advertisements.

Peter the Great: A Life of Peter I of Russia, called The Great. By Stephen Graham. (21s.) There is no biography of Peter in any language which is as full or as clear as this intimate study made from original sources.

Memories of Four Fronts. By General Sir William Marshall, with an introduction by General Sir Ian Hamilton. (21s.) Sir William Marshall, who succeeded to the command of the Mesopotamian Expeditionary Force on the death of General Maude, describes his war experiences in a volume of great interest and importance.

The Mansions of Philosophy. By Will Durant. (25s.) This is the long awaited sequel to *The Story of Philosophy*, in which Dr. Durant introduced philosophy to the millions.

Hilary Growing Up. By Stephen King-Hall. (8s. 6d.) A delightful sequel to *Letters of Hilary*, intended for slightly older children. The whole forms a lucid account of the structure of society.

Feminine Frailty. By Horace Wyndham. (18s.) The author of *Judicial Dramas* strikes a new note in crime books, since he deals only with the feminine side of criminality.

Dudley and Gilderoy. By Algernon Blackwood. (8s. 6d.) An odd, whimsical, and wholly delightful fantasy of Dudley, the King Parrot, and Gilderoy, the Sandy Cat.

Carr. By Phyllis Bentley. (7s. 6d.) The author of *The Spinner of the Years* and *The Partnership* has now written the extremely able and entertaining biography of Philip Joseph Carr, a fictitious West Riding manufacturer.